

COAL AGE

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Problems of the Coal-Mining Industry

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High Wages Promote Idleness

IF THE miner got a laborer's pay, he would be willing to accept a laborer's job, but partly because he gets from \$7.50 to \$9 a day the miner sticks to the industry and lies idle when the mines are closed. Lots of men will tell you a miner is as good as a "wood butcher" and therefore entitled to the carpenter's wages. Perhaps, but is the carpenter justified in getting his present pay? Furthermore most of the highly paid carpenters live in a city, have to pay city rents, have to travel long distances to their work and probably in the next few years they will be getting much less than today, for the era of construction has in most places already ended.

Economy in Rockdusting

THOSE who are purposing to rockdust their mines should look over their mine cars with the intention of making them at least relatively dustproof. Only by keeping coal from falling on the tracks can the cost of rockdusting be kept at a minimum. Whether the roads are rockdusted or not—and who is not going to use rockdust?—it is well to keep the coal dust on the roads at the lowest possible quantity. Those who anticipate difficulty in keeping the required percentage of rock dust on the roads should remember that the sand deposited by the haulage locomotives and ground under the wheels will materially assist in complying with the regulations of the insurance companies. In fact the sand thus distributed has probably already had no little effect in limiting explosions.

Will Gas Making at Mines Stabilize the Industry?

ACCORDING to the experts who reported on the Buffalo fuel problem, that city requires twenty-four million cubic feet of gas daily during the winter and an average of only about fifteen million cubic feet per day. Using the exact figures of the report the maximum demand averaged over a month would be one and two-thirds times the average for the year. Again comparing the maximum monthly with the minimum monthly demand the ratio would be two and two-thirds.

One cannot see that a demand so fluctuating would do much to correct the seasonal character of the coal industry if the plant were placed at the mine. The colliery that would supply such a line would work six days a week in the winter and two and a quarter in the summer. Not quite a pleasing prospect! The owner who would operate such a mine at full time would have to enter the general market and cut prices drastically.

To be perfectly frank, many of the much lauded industries function as badly or worse than the coal

industry. Authorities deny that fact, of course, and the public believes them, but facts are facts. The world is badly out of joint. The farmer and builder are idle in winter, the miner in summer. Some have two periods of idleness in the year and others have longer rests at greater intervals. But idle periods come to almost all workers, especially if they will not change their tasks. They come to their employers also who cannot change their equipment as readily as a man can change his job. It's just as well the public thinks the coal man is the only seasonal employer; if the public only knew the facts it would lose faith in humanity.

Progress in Safety

IN THE article by N. G. Alford in this issue is much assurance for the future. He believes that the biggest hazard of the present will be reduced before long by mechanical loading, for roof falls are going to be controlled more effectually when greater speed of extraction is attained. Despite the fact that the cutters and loaders make more noise than hand picks and that the loaders will work on the goaf face instead of from a crosscut in the body of the pillar, he anticipates greater safety. That, of course, remains to be proved.

The conditions which have enabled Col. E. O'Toole to mine pillar coal more safely than room coal may not be universal. "Kettle bottoms" are not found in every mine. Mr. Alford ascribes the safety in pillar drawing in Col. O'Toole's mines to the fact that the kettle bottoms are loose over the pillar whereas in an advancing room they are so tight that they are not noticed. Suddenly in advancing places they lose their hold and fall, whereas in pillars they come down with the coal. A similar condition, however, is not unusual with ordinary drawslate. So perhaps he is right. The drawslate and kettle bottoms will no longer be a big hazard, and the roof proper or the thicker drawslates will not be a menace when the rapidity of extraction is increased.

Rockdusting will defend us against coal-dust explosions and if we can keep our cars coupled at the loading and discharge points we can save both casualty and time losses. Better cars and surer tracks with wheels kept from flattening and grooving will do much to minimize derailments. It is well if this can be done as greater speeds, more machinery and more gas are likely to add to our dangers. Let us hope we may overtake Great Britain in the loss of life per man employed as we have surpassed her per ton mined.

The present need is to keep in constant mind G. B. Butterfield's slogan, "Every mine rockdusted by Oct. 1." If this is to be done, we must be up and doing, for a mine that is operating cannot be properly dusted in a few days, and machinery for the work even if dust is purchased cannot be obtained with promptitude seeing that at present only one or possibly two firms are engaged in its manufacture. As the winter ap-

proaches with its ghastly forebodings, every effort should be made to obtain such machines and do such dusting. Let not another winter be approached with the mines unprepared.

A Phenomenon or an Illusion?

WE DO not attempt to explain it. Some things are altogether above and beyond us. We cannot hope to tell anyone why coal mining is the "worst functioning industry." It is plainly a phenomenon, an inexplicable fact of nature. The British likewise find it hard to explain; it is puzzling the French. The Germans, who have solved every problem but the value of the mark, also find this problem difficult.

Arnold D. McNair, in a booklet on the British coal situation entitled "The Problem of the Coal Mines," says: "The reason for the frequent crises in the coal industry is the bad organization of that industry," and the next charge is "The principal defect in this organization is that it does not allow the miner to take a more active and more mental part in the industry." Clearly the industry is wrong because the employer and not the employee directs it. Mr. McNair having solved one phenomenon so easily, What is wrong with the coal industry?, let him try and solve the other one, "Why is the coal industry more wrong than any other industry?" There are other industries beside coal that are not directed by employees and in which employees take no part in direction. In fact there are few indeed and those small that are directed from the bench instead of the office. But in none of those cases has the industry been made wrong or worse functioning. Only coal should think it necessary to let brawn direct brains.

Most of the criticism of the coal industry is absolutely true and relatively false. Every essential industry in every clime unless regulated by the government to its minutest detail is sure to be said to function badly. When it is government owned, operated or controlled the public is satisfied through conditions may be worse. The public then is manager and cannot find fault with its own management unless it is glaringly and transparently inefficient and blundering. After all is said the coal industry is not the worst or the worst-functioning industry. It is not a phenomenon we are discussing; it is an illusion. But are not all illusions phenomena?

Rockefeller Sheds No Tears

JOHN D. cracked his crude oil and made gasoline and a byproduct that he could not sell except as fuel oil. He could not dispose of enough of this byproduct. Still he wept no tears. He sent out his agents to tell how excellent a value the public was overlooking, that oil was better than coal any day, better for this and better for that. He wasn't weeping. He was merchandising.

The coal man weeps. He is worrying about no sale for slack and about the inroads of oil. Let him take after Rockefeller. Let him get all his facts together and sell slack. Maybe then the same jinx will get him that got John D. He sold so much oil that the price went up, and it doesn't pay to use fuel oil any more. He depressed the coal market so much with his oil that it paid the consumer to change his equipment and burn coal.

Get after him as he got after the coal man. Perhaps

his oil will come down from lack of sale and your fine coal will go up by reason of excessive demand, so that once more oil will have a day—a brief day—in the sun.

But shed no tears. It is active, concerted effort that will sell slack. No forebodings, fears, lamentations, prognostications, regrets, none of the many formularies we have been accustomed to use for the cure of the situation will help the sale a jot. Just plain merchandising of an idea and that idea that fine coal with mechanical stokers and medium sized coal on grates will do the work better than oil or coarser coal. Don't rest satisfied with putting a card in the local papers with your name and address and the name of the mine or region from which your coal comes. Try to sell an idea—the idea you want, the idea the consumer wants.

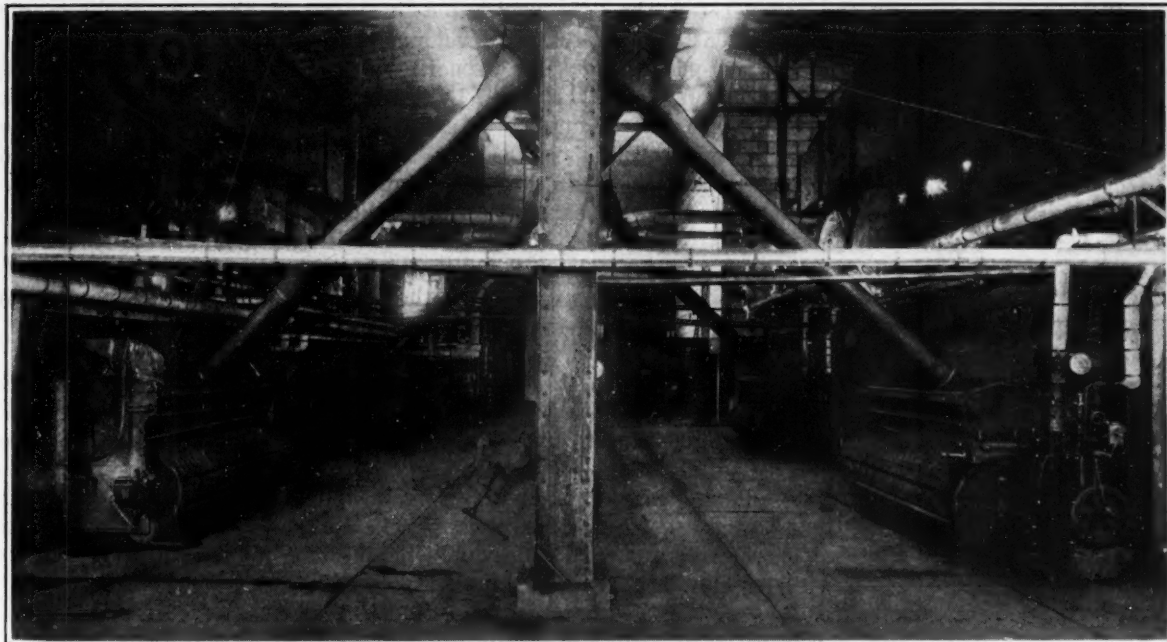
You couldn't convert the African to the value of ice by sending over a business directory. To get anywhere you would have to sell the idea of using ice to these gentlemen of color. It's the same with fine coal. The consumer knows what it is and doesn't want it, till he is told why he should want it, the labor it saves, the service it renders, the price it is sold for. Sell him individually and collectively the idea of the economical use of fine coal, and all the problems of merchandising and operation will be solved except that a crusher may soon have to be purchased at your mine.

Arguments for Unionism

A FEW weeks back a coal operator obtained a contract from a railroad company by ruthlessly underbidding his competitors. The price he set for his coal was \$1.50 a ton. No sooner had he obtained the contract than he went down to the mines and notified his employees that the price for which he had sold his coal would not permit him to pay them the former rate of wages. They must accept a reduction of one-third in the wage scale. The employees accepted the wage cut and continued at work.

This kind of cut-throat competition is making operation difficult for companies who desire to use their men fairly and is reducing the wages of mine workers below the cost of even the most frugal living. No wonder that operators have at times advocated unionism arguing that such unfair competition was making the operating of coal mines an industry in which few well-meaning men would care to engage. Such behavior has convinced some operators and is fast convincing others that the beneficence of the employer is not a sufficient pledge that mine workers will receive honorable treatment. Not many men are disposed to conduct their business in that manner, of that we may be sure, but what of that? With a few men playing their hand so unfairly it becomes increasingly necessary for all their competitors to be equally callous as to the needs of their employees and to ask their men to consent to receive wages which their employer knows is below their needs and deserts and not in accord with the best business ethics.

Many times in the past has competition in the reduction of wages argued effectively for unionism and for its recognition by employers. Beware lest it argue again and so forcibly that the expression the "Solid South" will be applied to its unionism instead of its politics.



Interior of Boiler Room, Donk Mine No. 4

Illinois Mine Generates Own Power Cheaply

All Pickings and Some Slack Burned—Superheated Steam Used—Exhaust from Hoist and Auxiliaries Utilized in Mixed-Pressure Turbine—Costs Reduced to 1.6 Cents per Kilowatt-Hour with Plant at Half Capacity

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SO MANY mines nowadays are operated on current purchased from a central station that it is a matter of considerable interest that a sizable operation, such as the No. 4 mine of the Donk Bros. Coal & Coke Co., in Madison County, Illinois, lying within easy reach of central-station power, is deliberately equipped with a generating plant of its own.

The decision to generate, rather than to purchase, power was made when the designs for this plant first were formulated. This was back in 1918 and 1919, when the power service in that field was subject to many interruptions. But it was reaffirmed far more recently, even though many improvements had been made meanwhile in central stations and in the service they render. This mine and its power plant were completed only last winter, but the mine had been operated since 1921, the hoisting capacity of the original equipment having been only 2,000 tons per day. At present, the mine can produce 3,500 tons of coal daily and has a hoisting capacity of 6,000 tons.

Since the original or partial installation was completed, there has been ample opportunity to study the conditions existing. It was, however, decided to follow

the power policy originally adopted and to operate the mine from an individual steam plant. In the meanwhile, one of the other mines of this company had been worked out and still another had been sold, leaving one good-sized property—No. 2 mine—still operating in addition to the new No. 4 development. The No. 2 mine has been partially electrified and is operating on current from No. 4.

SPECIALLY DESIGNED PLANT GENERATES CHEAPLY

It was believed that a power plant designed especially for mining conditions and equipped to burn mine refuse, could produce power cheaper than it could be purchased. The results obtained up to the present time on partial tonnage bear out this conclusion. The general design of the plant, as described in *Coal Age*, of June 9, 1921, has been followed with certain minor improvements and modifications, which will be described.

The relative economies of a steam hoisting engine and an electric hoist at No. 4 mine were carefully considered from every possible angle. It was found that the power cost would be slightly in favor of the electric hoist and that the water requirements of the plant would be lessened by it, but the initial investment entailed by an electric hoist would be greater. It was, therefore, decided to install a steam hoist using a regenerator and a mixed-pressure turbine as a means of utilizing the exhaust steam from the hoist.

A compact and economical arrangement was obtained

NOTE—An article by the same authors describing the bottom and surface works of this mine appeared in *Coal Age* of June 26, 1924. The headpiece illustrates the eight horizontal return-tubular boilers in the Donk No. 4 boiler room. These are set in four batteries. Each battery is fired by one stoker. The large water capacity of this type of boiler guards against the heavy fluctuations of pressure caused by the intermittent operation of the hoisting engines.

by locating the main hoisting engines in the northwest corner of the boiler house in a space opposite that occupied by the boiler auxiliaries and the regenerator, the engine and the other equipment being separated by the firing aisle. By this arrangement the new batteries of boilers were set exactly opposite the old ones and the coal feed to them was taken from the same outlets in the coal bunkers above the aisle. The steam hoist draws its steam from one corner of the loop header and the turbines from separate outlets on the other side of the piping system, thus giving an excellent distribution of steam demand.

Return-tubular boilers were adopted in the first installation, because with them a large volume of water could be obtained to meet the sudden demands for steam imposed by the hoisting engine. The results obtained from the first two batteries of boilers were highly satisfactory, fluctuations in steam pressure within them being much less than could be anticipated with the same horsepower of water-tube boilers. This type of steam generator is eminently adapted to use in hoisting plants, and by utilizing battery settings, as in this instance, it is possible to obtain reasonably large units with fair economy of floor space.

The original power plant was equipped with two pairs of 78-in. x 20-ft. boilers having a total rated capacity of 800 hp. Each pair of boilers was set over a single stoker of the Harrington type.

UNITS WERE CHOSEN TO MEET PLANT NEEDS

The generating equipment originally installed consisted of one unit having a rated capacity of 450 kw. of 2,300-volt, 3-phase, 60-cycle alternating current. This unit was direct-connected to a Chuse 28x32-in. uniflow engine, which was operated non-condensing during the development period. A small 50-kw. engine-generator was also installed for lighting and miscellaneous service. A pair of 18x36-in. hoisting engines serving the auxiliary shaft and a steam-driven fan completed the major equipment of the first installation.

The boiler house is of steel-frame construction with walls of hollow tile. These are gunited on the outside and in the part used as an engine room are plastered on the inside. The boiler room is 92x100 ft. in plan and in the original construction was built so as to accommodate future units.

The size of the turbine room was increased somewhat from the original plans in order to provide for the new power units and for future units as will be described later. The completed building is 45x116 ft. and has a basement 13 ft. 6 in. high.

The completion of this plant involved a large increase in power capacity. The selection of units was made on the basis of a 6,000-ton output per day for No. 4 mine and a load varying from 900 kw. to 1,200 kw. as determined by a power survey of the No. 2 operation. In view of the large initial cost of an electric hoist for the No. 2 works, it was decided to leave the No. 2 steam hoist in place.

In planning this power house, the engineers had the unusual advantage of nearly four years of experience gained with the equipment originally installed. But, so satisfactory had been the operation that the original designs for and the arrangement of power units were followed without material change. It was decided, however, to add certain power-saving details to the original units, such as a condenser for the uniflow engine, superheaters for the original boilers and a clarifying sys-

tem for the water supply. These were omitted from the first installation, largely because their cost would not be warranted in view of the low tonnage obtained during development work.

The capacity of the original boiler equipment was increased by the addition of two batteries, which are duplicates of the original; each consists, as before, of two 78-in. x 20-ft. return-tubular boilers set over a single Harrington stoker. The plant now has a rated capacity of 1,600 boiler horsepower and when operated at 150 per cent of rating is capable of delivering regularly 2,400 boiler horsepower. This is sufficient for the operation of the No. 4 mine at rated capacity, together with the electrically-driven units installed at the No. 2 plant.

The grate area under each battery of boilers is 90 sq. ft., which is the same as that installed in the original plant. This gives a ratio of heating surface to grate area of 33½ to 1. The new settings are similar to the old, but the distance from the grate surface to the underside of the boiler shells in the new settings was made 7 ft. 3 in., which is slightly higher than in the old installation.

A concrete stack, 9 ft. in diameter and 136 ft. high, and a forced draft fan of 48,000 cu.ft. capacity when operating against a 1½ in. water gage, were both included in the original installation. They were regarded as ample to meet present requirements, although the general design of the plant provides for another stack and a duplicate fan should the load be increased by the addition of other mines.

This plant was designed to burn low-grade fuel, or that possessing little or no market value. The coal supply at the present time consists of crushed gob or pickings from the picking tables, together with the quantity of 1½-in. screenings needed when enough pickings cannot be obtained. The provision for utilizing low-grade fuel is regarded as being of the utmost importance. First, it reduces fuel bills and, second, it tends to improve the quality of the coal produced at this mine.

The tendency at this operation will always be to pick thoroughly and to clean the coal well. Combustible pickings are not wasted, as at mines operated on purchased power, and the pickers consequently need not spend undue time in breaking up lumps in an attempt to separate rock from coal.

Fuel for the boiler plant is drawn from a small track hopper. This hopper can be utilized also for "foreign" coal or coal from the auxiliary tippie. It is fed by a conveyor from the main tippie where the gob and bone from the picking tables is crushed to 1½-in. size and any deficiency in supply made up by the addition of 1½-in. slack.

AUTOMATIC DRAFT AND STOKER CONTROL PROVIDED

The original forced-draft installation with its control mechanism was extended by means of ducts provided with proper dampers from the forced-draft fan. A curved breeching from the new boilers was connected with the stack. Both of these installations are adapted to connect also to a duplicate fan and another stack which may be required at some future time. The dampers, fans and stokers are all controlled by a balanced-draft system.

This equipment automatically maintains a draft of approximately 0.08 in. over the fire through proper regulation of the fan speed and the position of the

uptake dampers. Means for controlling the draft of the individual boilers is also provided through installation of stoker gates which insure the proper air pressures and volumes for the various compartments of the grate.

Approximately 150-lb. gage pressure is the maximum that can be safely carried with boilers of this type. This pressure is accordingly carried on these units and approximately 100 deg. F. of superheat is added. The superheaters are located in the rear combustion chamber. The new settings were fitted with superheaters when built, and superheaters were then added to the original settings. Ashes are removed by a steam-jet ash conveyor, which lifts them into a reinforced-concrete storage bin, from which they are loaded for disposal into cars running on a standard-gage track.

For the removal of soot from the flues, Vulcan blowers have been placed at the rear of the settings. These are fitted with elements that will operate on both the boiler and superheater tubes. The main steam header is a loop system of piping fitted together with

high has been provided. This is equipped with an automatic chemical-measuring device for introducing alum and caustic soda. The normal capacity of the settling system is 6,000 gal. per hour, allowing approximately four hours for flocculation and settlement of sludge.

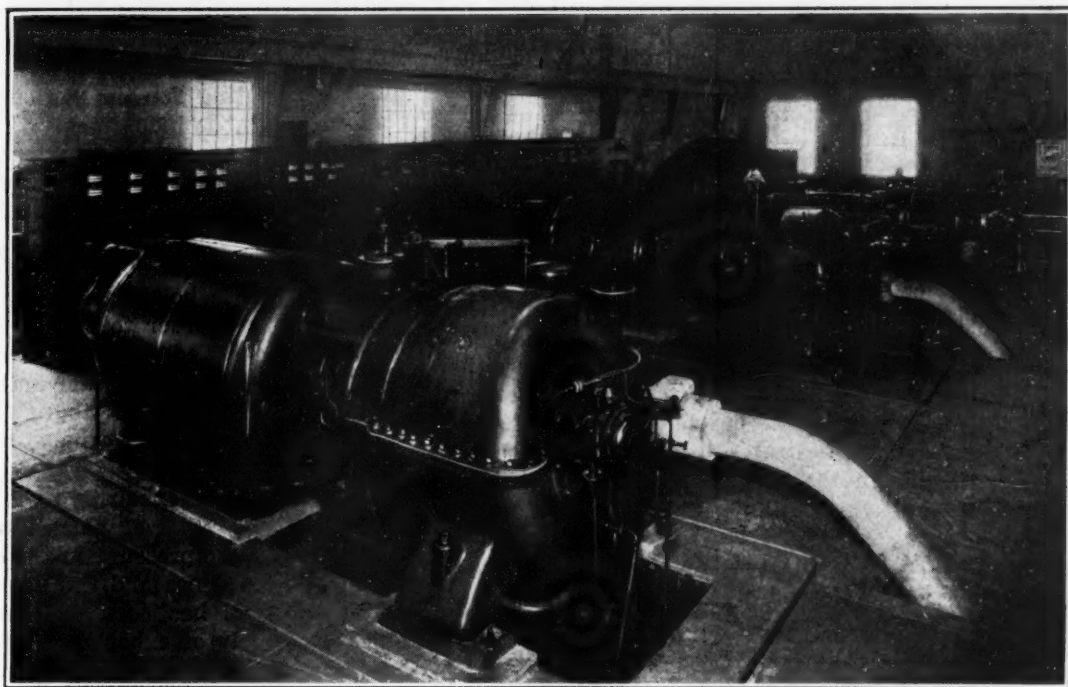
ONLY FILTERED WATER REACHES THE PLANT

Under average conditions, approximately $\frac{1}{4}$ lb. of alum and $\frac{1}{4}$ lb. of sodium hydroxide per thousand gallons of water treated is required. It is necessary to clean out the sludge about every ten to fourteen days. Water leaving the settling tank is pumped through two pressure filters, each of 6 ft. 6 in. diameter and 6 ft. 10 in. high, to an elevated storage tank having a capacity of 40,000 gal. and affording a minimum head of 40 ft. From this tank, water is drawn for all plant purposes. The arrangement of the settling system is such that the flow of water is automatically controlled and regulated by the water level in the main storage tank. The make-up water for the power plant is further treated

FIG. 1

Power Plant

This plant now contains a high-pressure turbo-generator, a mixed-pressure turbo-unit, utilizing the exhaust from the hoist and various auxiliaries, and an engine-driven unit. All these machines are operated condensing. Provision has also been made for the possible future installation of another turbo-generator when the load on the plant becomes heavy enough to warrant it.



Vanstone flanges and large-radius expansion bends. Angle stop valves are installed on all outlets both to and from this header. These eliminate many fittings and obviate water pockets in the line. High-pressure traps handling the condensate from the steam lines return all drips to the feed-water heater. An auxiliary header supplies steam to the boiler-feed pumps and auxiliary units.

In order to enable the firemen to operate the plant to best advantage, meters have been installed upon each boiler. These indicate the flue-gas temperature, the percentage of excess air and the steam flow. A water-supply system was constructed several years ago, fed from surface drainage to a pond approximately $1\frac{1}{2}$ miles from the plant. A portion of the watershed or drainage area consists of cultivated fields, and as a result the water usually carries much mineral matter in suspension. This water is objectionable, not only as boiler feed, but also for use in showers, wash basins and other plant facilities.

To eliminate the matter held in suspension, a 30,000-gal. settling tank 18 ft. in diameter and 18 ft. 4 in.

by a zeolite system, thus insuring clear water of practically zero hardness.

Treated water is sent to the boilers through a feed-water heater by means of a 12x8x12-in. steam-driven direct-acting duplex pump. This is controlled by boiler feed-water regulators with pressure governors on the pump.

The normal full-load generating capacity of this plant is 2,700 kw., made up of the following units:—One 1,500-kw., 0.8-power factor, high-pressure, turbo-generator, with direct-connected exciter; one 750-kw., 0.8-power factor, mixed-pressure steam turbo-generator, also with direct-connected exciter, and the original uniflow 28x32-in. engine unit, direct-connected, to a 450-kw. generator with a belted exciter. Although the original unit was run non-condensing during the development period, all machines are now operated condensing. Provision has also been made for the possible future installation of a third turbine, which will probably be of 2,000-kw. capacity.

Direct current is used underground. This is supplied from motor-generator sets installed within the

mine and fed by 2,200-volt alternating current through armored transmission cables. Storage-battery locomotives are used for gathering. They are charged on the second, or night, shift.

The established power requirements of this plant, including both electrical and steam loads, the latter including the requirements for heating the tipple and wash house, are shown in Table I.

Table I—Power Requirements at Donk No. 4 Plant

	Average Load, kw.	Sustained Peaks, kw.
Mine No. 2 only, already fully developed...	900	1,200
Mine No. 4 only.....	1,500	2,000
Mines Nos 2 and 4 combined.....	2,050	2,600
Mine No. 4, charging shift.....	650	.....
Mine No. 4 idle shifts.....	330	.....

At the present time, the load from No. 2 mine, when No. 4 is idle, is carried by the 1,500-kw. unit, or by the 750-kw. unit when running on high pressure. When only the No. 4 operation is running, the load is carried by the 750-kw. mixed-pressure unit supplemented by the 450-kw. machine operating condensing. When both mines are in operation, the 1,500-kw. unit is put into service in place of the 450-kw. machine. For the ultimate load, when both mines are in operation, the 1,500-kw. unit and the 750-kw. mixed-pressure unit, can carry the load supplemented, if necessary, by the 450-kw. machine, and for No. 4 mine alone the two turbines will easily carry the load.

SPACE PROVIDED FOR ADDITIONAL POWER UNIT

It will be noted, however, that an accident to any unit will seriously cripple the operation when the full load is on, and space accordingly has been provided for a 2,000-kw. turbine to be installed in future when the load begins to approximate the anticipated ultimate amount. This future machine supplemented by either of the other units easily will carry the entire load. When the ultimate load on the plant is attained, however, it also may be desirable to add a spare battery of boilers, although the four units now provided will carry the load at approximately 150 per cent of normal rating.

The water rates of the various power units are as shown in Tables II, III and IV.

All units are fitted with surface condensers. The uniflow engine is provided with a condenser of 1,220 sq.ft. of tube surface, a 1,250-gal. per minute circulating pump, and duplicate Radojets. The 1,500-kw.

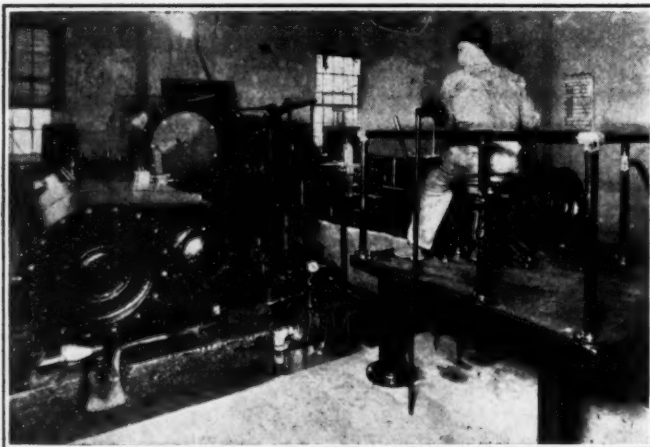


Fig. 2—Steam-Driven Hoist

Investigation showed that an electric hoist would be slightly more economical than one operated directly by steam but would entail a much higher initial investment. A steam hoist accordingly was chosen. The exhaust from this unit is passed through a regenerator and thence through a mixed-pressure turbine.

Table II—Water Rate, 450-kw. Uniflow Engine

	Non-condensing, Lb. of Steam per Kw.-Hr.	Condensing, Lb. of Steam per Kw.-Hr.
1/2 load.....	29	19.4
3/4 load.....	27.9	18.5
1/2 load.....	27.9	18.5
Full load.....	29	19.1

Table III—Water Rate, 750-kw. Mixed-Pressure Turbine

Lb. of Steam	Low pressure, Lb. of Steam per Kw.-Hr.	High pressure, Lb. of Steam per Kw.-Hr.
1/2 load.....	47.9	26.2
3/4 load.....	42.0	22.3
Full load.....	41.0	20.5

Table IV—Water Rate, 1,500-kw. High-Pressure Turbine

	Lb. of Steam per Kw.-Hr.
1/2 load.....	19.4
3/4 load.....	18.5
Full load.....	18.6

unit and the 750-kw. unit are provided with condensers of 4,000 sq.ft. tube surface and 3,500 gal. per minute circulating pumps with Radojets and after-condensers.

Air for circulation through the turbo-generators is purified by an air washer located in the basement of the power house. All turbines are set on steel supports composed of box sections filled with concrete. These provide a setting for the various machines and their condensers that is independent of the floor.

Low-pressure steam for operation of the 750-kw. mixed-pressure unit is drawn from the exhaust of the main hoisting engine, the auxiliary hoisting engine and other plant auxiliaries with a view to utilizing all the steam not required for feed-water heating. The operation of the hoisting engines is necessarily intermittent, and in order to furnish a continuous flow of steam to the mixed-pressure turbine, a pair of regenerators, each 9 ft. in diameter and 25 ft. long operating in parallel and set one above the other, have been interposed between the exhaust-steam header and the turbine.

The flow of the exhaust to the regenerators is controlled by a flow valve, which is adjusted to maintain automatically the pressure in the exhaust-steam system between the engines and the flow valve at a minimum of 1 lb. This has been done in order to assure a sufficient supply of exhaust steam for feed-water heating. It provides a uniform temperature within the feed-water heater of approximately 205 deg. F.

Each regenerator stores 600 lb. of steam when the pressure falls from 18 lb. per square inch absolute to 14.7 lb. When the pressure is 19 lb. per square inch absolute and drops to 14.7 lb. per square inch, 700 lb. of steam is available. Any excess of steam after the regenerator and feed-water heater requirements have been filled, is vented to the atmosphere through a specially designed back-pressure valve.

CIRCULATING WATER COOLED IN A SPRAY POND

Should the supply of exhaust steam fail, because of the hoisting engines not being in service, high-pressure steam is automatically cut in and supplied to the mixed-pressure unit when low-pressure steam drops to a predetermined point, or, in other words, whenever high-pressure steam may be required for carrying the load.

The available supply of water for condensing purposes, as is frequently the case at plants located in this region, was limited, and it was accordingly necessary to provide a spray pond for cooling the condenser water.

FIG. 3

Spray Pond

Water for condensing purposes is obtained only with difficulty at many mines. By using a spray pond the circulating water of the condenser may be used over and over again sustaining losses only from evaporation, from leakage and from the blowing away of spray by the wind. These losses readily are replaced. Such a pond gives best results when the atmosphere is dry and its poorest results when it is humid. Under ordinary circumstances, however, it affords fairly satisfactory service regardless of weather conditions.



As this pond is located opposite the power house and just across the mine tracks from it, the pipes to and from the pond are carried under the railroad fill. The condenser water is circulated by motor-driven centrifugal pumps. The spray pond is 100x271 ft. in plan and 264 spray nozzles are installed over it.

Sufficient spray-pond capacity is provided for handling 10,500 gal. of water per minute when a pressure of 7 lb. per sq.in. is available at the nozzles. This gives a capacity of 40 gal. per minute per nozzle at the pressure named.

The switchboard installed in the power plant is of the remote manually-operated type, with all switches mounted on separate pipe framework in the rear of the panels. This switchboard is located in a lean-to so that the board is flush with the south wall of the power house. Three-phase, 60-cycle alternating current is generated at 2,300 volts and fed to the various loads as required.

Banks of step-down transformers reduce the voltage from 2,300 to 220 for all motors installed on the surface as well as for lighting in both auxiliary and main tipples. An outdoor step-up substation composed of three 333-kw. single-phase transformers raises the voltage to 33,000 for transmission to the No. 2 mine at Maryville.

At mine No. 2 a step-down station of the same capacity, as that above described, reduces the voltage to 2,300 at which potential current is supplied by way of a borehole to 2,300-volt alternating-current, 265-volt direct-current synchronous motor-generator sets installed within the mine. These machines supply direct current to the mining machines and haulage locomotives.

The underground load at mine No. 4 is served by a 2,300-volt line extending down the auxiliary shaft to synchronous motor-generator sets installed at strategic points underground in a manner similar to that followed at mine No. 2. By using these synchronous motor-generators and giving them a leading power factor, the power factor of the whole plant is held

approximately at unity, notwithstanding the fluctuating loads that are encountered.

The operating results obtained at this plant have thus far proved highly satisfactory. Power costs have been reduced month by month until, with a tonnage at No. 4 mine scarcely more than half its rated capacity, the cost per kilowatt-hour for power used at both operations has been reduced to 1.6c. This includes all plant labor and maintenance with a suitable proportion of the total executive and clerical expense. It includes also interest and amortization of the power plant and its equipment, as well as coal charged to the plant at the regular market price, although at least one-third of the fuel now burned consists of pickings which not only have no commercial value, but which otherwise would have to be disposed of at an additional expense.

The operating executives of the Donk Bros. Coal & Coke Co., under whose direction the construction and development of this mine and plant was performed, are: Edwin H. Conrades, president; Edmund C. Donk, vice-president; and Walter J. Clark, general superintendent. The plant was designed and constructed by the Allen & Garcia Co., of Chicago, under the immediate supervision of Wayne O. Axtell, resident engineer. From the results already secured, it is fair to predict that power and mining costs will be materially reduced from their present levels when the tonnage of the mine approaches its normal rating.

THE UNION PACIFIC COAL CO. has eliminated black powder from its mines. It is extending its water lines to the face of the workings so that all loaded cars may be drenched before they are started out of the mine. As has been announced adobe or rock dust has been spread in the mines, the work having been under way for six months. This will be completed by the fall when the low humidity season sets in. All mines known to be gaseous are being run on 100-per-cent closed lights and an order for 2,100 additional electric lamps has been placed to make the installation complete in both the gaseous and non-gaseous mines of the company.



Tipple at Grob, Land Leased from U. S. Government

U. S. Rules Make Mines in Public Lands Safer

Regulations Could Not Go Into Detail to Meet All Conditions in Forty Million Acres of Coal but Sound General Principles Are Covered Benefiting Miner, Operator and Public

BY H. I. SMITH

Mining Supervisor, U. S. Bureau of Mines
Denver, Colo

PREPARING regulations for coal mining on leased public lands in the United States was no simple matter. It was difficult indeed to frame rules applicable to mining in all the coal deposits in the 40,000,000 acres under government control but the general principles of good mine operation were covered with safety especially in mind. The regulations, as they now apply in the 670 leases on more than half a million acres in fifteen states are believed to be absolutely sound and fair, beneficial alike to miner, operator and the public. I cannot go into all the details of the regulations but after tracing their history, I want to touch upon some of their features which have to do with safety.

In 1913, the Secretary of the Interior charged the Director of the Bureau of Mines with the duty of inspecting the physical operation of coal, asphalt and such other mines as belong to the Indians and Indian tribes wherever located and to draft necessary rules and regulations from time to time regarding the operation of leases over such Indian lands and all other lands leased by the Department of the Interior for mining purposes or operated subject to its approval. These regulations must be submitted to the Department for its approbation.

The first regulations, prepared by the Bureau of Mines, and applicable to coal mines on public lands, were approved May 10, 1913. They applied to the lease

of the Owl Creek Coal Co. in Wyoming, which lease was granted by special act of Congress. The only other lease operating on public lands, other than in Alaska, prior to 1920, was that of the Victor American Fuel Co., to which a lease was granted by a court decision. This lease was supervised by the General Land Office. The operating regulations applicable to leased coal lands in Alaska were the second set of rules which the Bureau assisted in preparing. They were approved May 18, 1916.

BUREAU MAKES REGULATIONS FOR LESSEES

When the act of Feb. 25, 1920, was passed permitting the leasing of coal, oil shale, phosphate, soda, oil, and gas on public lands, the Bureau was delegated to prepare the operating regulations necessary, in accordance with Sections 30 of the Act, which reads in part as follows:

Each lease shall contain provisions for the purpose of insuring the exercise of reasonable diligence, skill, and care in the operation of said property; a provision that such rules for the safety and welfare of the miner and for the prevention of undue waste as may be prescribed by said Secretary shall be observed.

In the preparation of these regulations invitations were sent to the American Institute of Mining and Metallurgical Engineers, the American Mining Congress, the National Coal Association, and to the governors of eleven public-land states, to appoint representatives to attend a hearing at Washington. Prior to the date set for this meeting, regulations were prepared as a basis. These were considered one at a time at the session and were discussed at length.

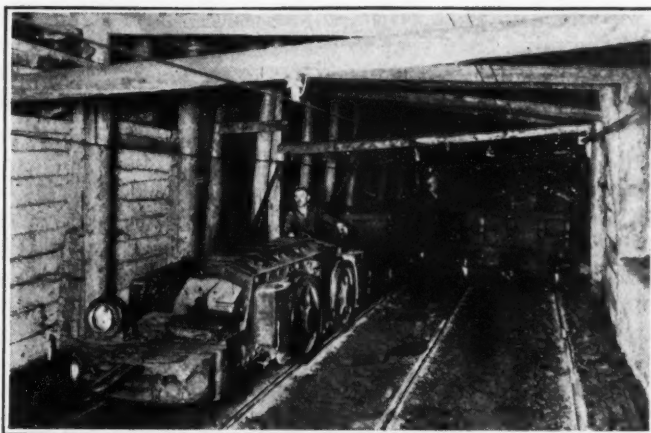
From the minutes of the several sessions a second

NOTE—This article is constructed from a paper read by Mr. Smith at the February meeting of the Rocky Mountain Coal Mining Institute at Denver. The headpiece shows the oldest lease on Government lands, granted by a special act of Congress, Aug. 1, 1912. This mine, which is owned by the Owl Creek Coal Co., has the biggest production of any mine operated on lease from the United States. In 1923 this plant produced 293,424 tons. Illustrations furnished by courtesy of Goodman Manufacturing Co.

set of regulations was prepared and re-submitted by mail to the delegates and other prominent mining men for their further comment. These comments were carefully tabulated and in general the prevailing opinions were adopted. Whenever possible, the exact wording of some one of the delegates was used. The regulations now in effect were approved by the Secretary of the Interior, April 30, 1921, and are now just as much a part of the contract as any other paragraph in the lease.

I will not refer to the policy of Congress or to the history of how the United States retained control of 40,000,000 acres of coal land. I use the term "control" qualifiedly, as 37½ per cent of all the income goes direct to the state in which the land is located; 52½ per cent is appropriated to the Reclamation Fund; and only 10 per cent for supervision is retained by the Government.

There are on this area at the present time under lease or applications for lease, coal beds as thin as one foot in thickness to beds 100 ft. thick; some beds lie horizontal, others are practically perpendicular. Almost any dip between these extremes can be found. The cover varies from stripping operations where the dirt



Locomotive Pulling Trip of Empty Cars at Gebo

Four 6-ton, two-motor locomotives operate on the comparatively level cross headings and haul trips of from 45 to 50 cars to the main slope taking them from the various partings on the cross entries. Only alternate sets of levels become electric haulage roads.

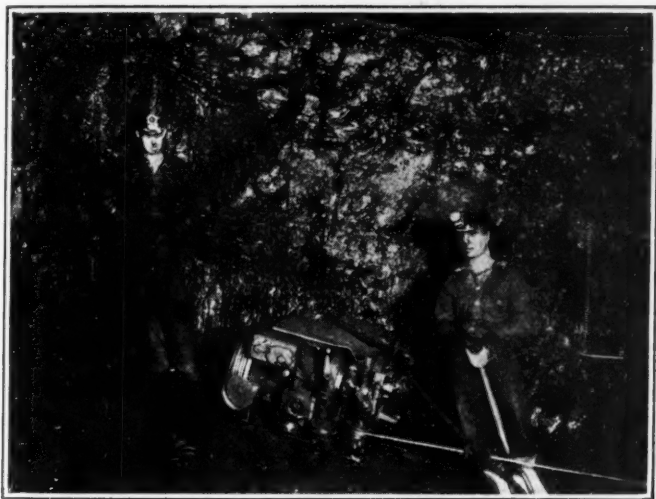
favorable to making changes in mining methods. Again, it was impossible to change a mine which had been in operation for many years, except to modify the projected plans and working conditions and provide for the required safety features.

I do not wish to enter into too much detail in discussing the application of the rules to the leased public coal lands and to mining operations on public lands covered by prospecting permits, but I do wish to discuss briefly a few of the things which, from our inspection of mines on leased lands or adjacent to leased lands, should be stressed even though some of them may be considered as old subjects.

Those topics which I have chosen relate to fireproof buildings, electric installations, explosives, explosions, rescue apparatus, and mine maps.

MINE MAPS SHOULD SHOW MINE PROGRESS

I have placed mine maps on the list as matters of leading importance because I wish to emphasize the fact that maps only rarely show such data as will enable the owners of the mine mapped, when they are called on by tax authorities, to show the depletion for the several tax periods. The maps usually made will not inform the owners what percentage of coal per acre has been mined, the condition of the abandoned



Shortwall Machine Cutting up Pitch in Gebo Mine

The seam at Gebo is inclined at an angle of 22 deg. to the horizontal. The rooms are arranged so that the coal is cut up the full pitch of the seam, the roads being laid on the strike of the measure and the main haulage road, which is laid with 60-lb. steel, going down the pitch of the seam.

is shoveled off the coal by hand to coal under an overburden of more than 2,000 ft. The grade of the coal ranges from lignite with 40 per cent of moisture, to anthracite. The size of operations range from a required production of 275 tons to 200,000 tons per year. This article will not deal, however, with many of the difficulties thus arising.

Since Feb. 25, 1920, under the provisions of issuing leases, licenses, and prospecting permits, 670 grants have been made, comprising more than one-half million acres of coal lands in fifteen different states. All of these grants are west of the Mississippi, with the exception of one lease in Alabama. Of this number there are 116 coal leases in eight different states, covering 60,000 acres.

The regulations necessarily had to be rather flexible for the natural conditions on the public coal lands vary as widely as coal-mining conditions could vary. The mining laws and mining practices in the several states varied widely. The attitude of labor was not always



Gathering Hoist Pulls Car from Room, Gebo Mine

Car is pulled by a hoist, located beneath the light in the end of the heading, uphill from the room neck and then is lowered down the stub slope to the parting on the level side entry. The steeply pitching mines of the Rocky Mountain region still use rope haulage extensively on the pitches but all the level haulages are by electric locomotive.

workings or what progress was made in the operation of the mine from year to year.

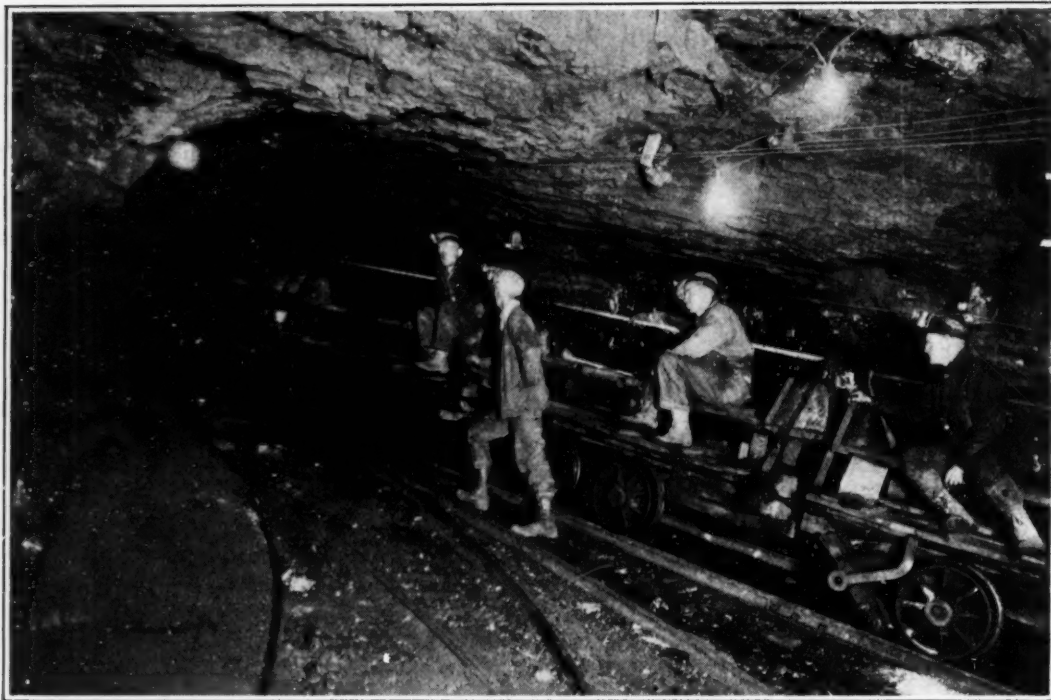
The production requirements of the leases granted have been, with few exceptions, based on a life of 50 years, so that, as a matter of good business, it is essential that the construction of temporary buildings of the firetrap nature be discouraged and that buildings be more of the fireproof type. The regulations provide that flammable buildings shall not be placed within 75 ft. of any mine opening. However, some consideration must be given to cases where the nature of the mine is such that the operation of the property will be only temporary.

With reference to wash-houses, one cannot imagine how quickly after a wash-house fire, a pair of burned overalls and a dirty shirt jump to the value of a dinner-suit and a silk shirt. The claims for lost watches and rolls of money are astonishing. After such an experience in a mining community, when many thousand dollars are claimed and lawsuits threatened, the local

Electric power is of such importance in American mines that the mining men of the present day are not attempting to increase safety by eliminating electricity, but by making conditions such as will be safe with the present electrical equipment, but if this cannot be done, the endeavor is to get electrical equipment which will pass tests entitling it to be termed "permissible" under the conditions to be imposed.

At the hearing in Washington, I can recall but one person who advocated higher than 300-volt current for portable machinery, and so 300 volts was set as the maximum voltage to be used on portable electrical machinery in the mines on public lands. However, mines equipped with higher voltage at the time of obtaining a lease may be permitted to continue its use upon petition to the Secretary through the mining supervisor.

Some thought that lead-covered cables in a conduit might be satisfactory for conducting high voltages underground, but analyzing the cost and the added



Gebo Man Trip

Men are lowered down the main slope in a train specially constructed for that purpose. They sit in such a location on the car that they are not likely to be struck by overhanging rocks at the side. With good seats men are not likely to burn one another with their carbide lights or be injured as they are when entering the mine on the regular trip.

management takes stock of all the buildings and starts a fireproofing campaign.

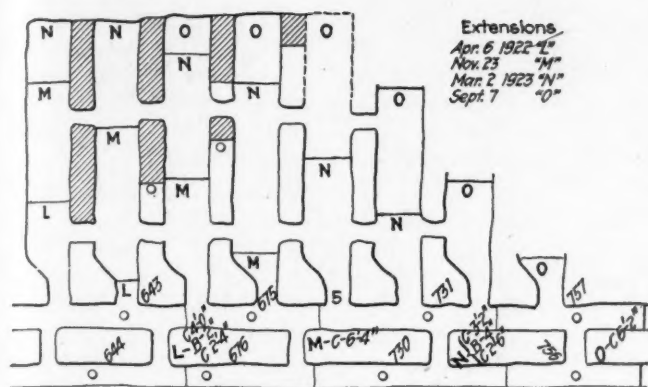
Fires start in wash-houses, as well as in other buildings, from spontaneous combustion and so every endeavor should be made to keep wash-houses clean, and no old clothing or towels should be permitted to be discarded and left where they may come in contact with steam pipes, or be deposited in any place where they will not be sufficiently well ventilated to prevent spontaneous combustion. One of the greatest fire hazards in a wash-house is present where the mine management permits those using the wash-house to put their towels or other fabrics on the steam pipes to dry. This is especially true should the clothing be oily.

The steam pipes should be sufficiently far from any contact with wood as to eliminate the chance that accumulations of lint will become ignited and set fire to the wood. Though the pipes should be protected to keep those using the wash-house from getting burned, the guards should be open to permit of radiation and to lessen the danger of fires.

safety, both to the employees and to the property, it was considered advisable to require an armored cable for all 2,300-volt circuits.

In regard to electrical installations, I wish to make two recommendations: First that a special color of insulation tape be used on high-voltage wire connections in power stations both on the surface and underground. As yellow has been adopted by a number of coal companies for this purpose, it is recommended that this practice be continued so that any newly employed electrician in a mine can tell at a glance which are the high-voltage connections. Black tape then should be used only for low or medium voltages.

Secondly, as alternating current rapidly has been replacing direct current for operating mining machines, I would advocate the use of a three-strand cable in place of three single wires. The more closely together these wires can be placed the less loss of power, and if all three wires are in a single cable, the accident hazard is reduced. The cost of stringing the single cable will almost balance the difference in cost.



How to Plat a Mining Working Historically

Some map makers use dates showing progress of development and coal extraction but a date, like a large number on an automobile is not desirable. A letter takes the eye more easily and conveys the message more rapidly. It also takes less room and when the map is photostated to a small size the letters are still legible. Maps today should be drawn with lettering that will make necessary information decipherable on a photostat of any dimension likely to be made.

There are many instances where electricity has been instrumental in igniting black powder, both in transit and at the working face. As a result, many employees have been suffocated and a number of dust explosions initiated. Consequently too much precaution cannot be taken to protect powder at the face adequately and to insulate all cars used for its transportation. Though the operating regulations permit the use of black powder under certain restrictions, the sooner it is entirely eliminated the safer it will be for mine employees and the less the loss to the operators in fires and explosions.

During the Pittsburgh meeting of the Coal Mining Institute of America in December, 1923, a demonstration was made to show how quickly a keg of powder would explode when brought in contact with electric current. Two empty powder kegs were laid on a block of wood with a wire connected to each keg. A full powder keg was laid across the two empty kegs, and the current turned on. The top keg was pulled by a rope so that a movement was imparted similar to that which it would get in a car. The keg exploded almost immediately after the first movement.

Mines are being rock-dusted as a means of preventing explosions in Pennsylvania, Illinois, Oklahoma, Wyoming, New Mexico, Colorado, Alabama and probably in other states. The English law, as is well known, requires that there shall be in all road and rib dust at all times not less than 50 per cent incombustible material. As a result of this law, all of the several explosions in Great Britain occurring during the past year were blanketed within a short distance from the point where they originated.

EVERY UTAH MINE MUST HAVE RESCUE APPARATUS

The state mining law of Utah requires rescue apparatus to be available for each coal-mining operation where fifty or more men are employed. The value of such apparatus can be appreciated only by operators who have had real emergencies of this character and who had previously provided such apparatus for their mines. The regulations require that at every mine in which more than one hundred persons are employed underground on any shift, the lessee shall have kept and maintained at the mine in order, ready for use, not less than five sets of oxygen or self-contained breathing apparatus. Many of the present lessees had equipped

themselves with mine-rescue apparatus prior to obtaining a federal lease and only a few have hesitated to comply with these provisions of their lease.

The regulations require that the mine maps be posted periodically. Some engineers keep maps showing the area mined over each extension period. This method requires a large number of maps. Other engineers use various methods to show where the room and entry faces were at the time of each extension. Some maps we get do not indicate in any way where the faces are at any time, except at the time of the last survey.

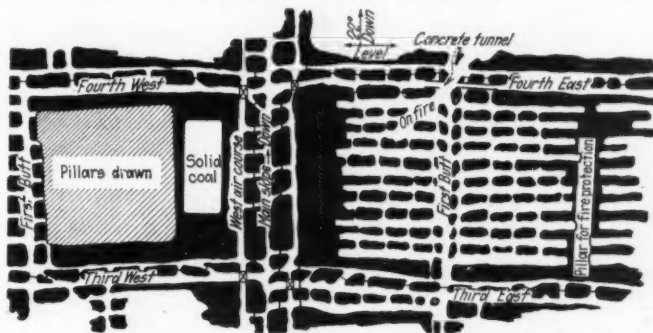
The method which appears to me to give the clearest picture of the mine and its history and to show those things which the Government requires shall be on the map of every lessee, is that worked out and used by H. P. Dyer, general manager and chief engineer of the Vandalia Coal Co., at Terre Haute, Ind.

The sketch which accompanies this article shows that in place of putting the dates at the face of the entry and rooms at the time of each extension, letters are used consecutively for each survey with the reference date on the margin of the map. A light line is drawn across the face of each room and entry, and the letter is put on the outby side. If the place is being worked at the time of survey, the ribs are extended beyond the face. If the place has been stopped there are no projections. Should the room or entry be caved or be inaccessible to the surveyor, the distance to the face is obtained as closely as possible from the mine boss or other reliable source, and the projection is shown in dotted lines.

Following the letter showing the projection on the entries, the section of the coal bed is given. Only the number of each fifth room is shown. Hatching is used only to show pillars actually extracted. The hatching does not extend over the room, nor does it cover stumps that the mine boss did not recover. This latter provision is important should any squeeze develop.

The Act of Feb. 25, 1920, requires in addition to periodic maps, that the elevation based on sea-level data be shown at 500-ft. intervals. Elevations and contours normally should be shown on separate maps.

All of the requirements under the regulations are of as much value to the operator as to the Government, and it is hoped that lessors of these public coal lands will realize this and co-operate more fully with the Government, in carrying out the regulations to the full.



Plan of a Section of the Mine Workings at Gebo

This shows the method that has been found most satisfactory in Wyoming where the measures quite generally pitch heavily. It has been found more economical and much safer to lay out the rooms on the strike of the bed. The main slope is equipped with a 2,000-hp. cylindrical-drum steam hoist located practically on the plane of the coal floor and equipped with a 1½-in. steel rope. It pulls out a trip of ten loaded cars, weighing 7,500 lb. each, 80 to 90 trips being made each eight-hour day. The hoist is probably the most powerful in Wyoming. Small electric drum hoists are placed at the head of the butt slopes.

Fatality Rate Per Man and Per Ton Sure to Decrease

Industrial Accidents as a Whole Have Increased—
Rapid Extraction Reduces Loss of
Life in Pillar Work

BY NEWELL G. ALFORD
Consulting Engineer, Pittsburgh, Pa.

IN THE last year industrial-accident rates generally have increased, but there has been no appreciable increase in our coal-mining fatalities over the past decade. A recent publication* cites that more than half the compensation states, representing all sections of the country, show an increase in industrial accidents of from 6 to 53 per cent, with an average of 29 per cent for all those reporting.

About coal mining, it is stated that "we are killing miners in the United States three times as fast as they kill them in Great Britain."† It is not mentioned, however, that we are mining slightly more than twice as much coal as Great Britain with 60 per cent as many men exposed to the hazards of mining. While the quantity of coal produced per fatality is not a proper measure of relative safety, the coal production per fatal accident in the two countries compared for 1920 is—

Great Britain—206,553 net tons coal (all kinds).
United States—244,828 net tons bituminous coal.

Table I gives the fatality rates per thousand of men employed in coal mining in Great Britain compared with bituminous mining in the United States from 1873 to 1921, inclusive. Of particular interest is the fatality rate for falls of roof and coal, also shown in Table I. More than half the fatalities are caused by roof falls, and though the annual number of fatal accidents from this cause has changed but little in the last fifteen years, as shown in Table I, there has been an enormous increase in mining without a correspondingly increased sacrifice of life.

AFTER ALL ROOF FALLS LEAD FATALITY LIST

Fatalities from roof falls deserve greater attention because they comprise over half of all the underground fatal accidents from all causes and, in a large majority of the localities, over half of all accidents from all ordinary causes. Table II gives the division of roof-fall fatalities, distributed by classes of work, and Table III gives a distribution of all fatalities by location. Both of these tables represent about 60 per cent of the Pennsylvania bituminous production for the periods they respectively cover, with the addition, in Table III, of data from two large companies in other states.

Table II shows work of mining and loading of coal to be most hazardous and the information in the first five lines and lines 8, 9 and 10 of Table III shows the hazard on pillar extraction to be greater than that in advance work for the usual methods of pillar extraction.

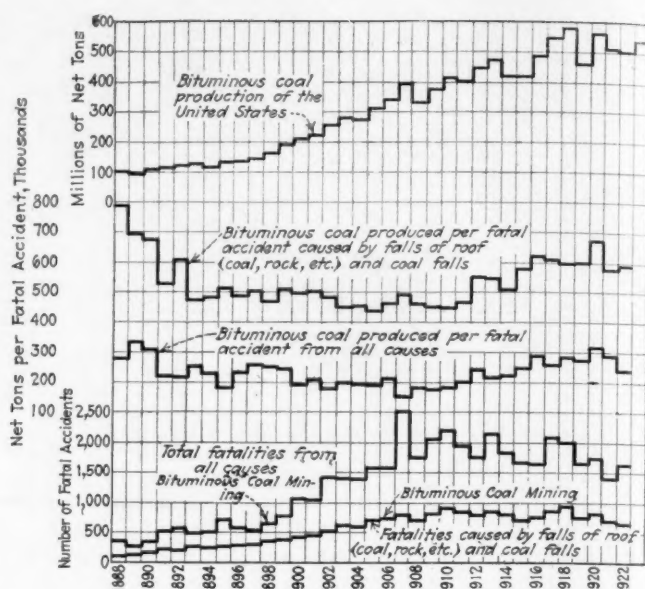
In Table III, the hazards from falls, in Pennsylvania mines, based on lines 1 and 2, is three times greater in pillar extraction than in advance work; $(209 \div 15.6) \div (266 \div 59.7) = 3$.

At Gary, W. Va., under Colonel O'Toole's manage-

NOTE—Article entitled "Engineering and Coal-Mine Accident Prevention," read before the West Virginia Coal Mining Institute, Elkins, W. Va., June 17-18.

*American Labor Legislation Review, June, 1924, page 180.

†John B. Andrews, "The Annals of American Academy of Political & Social Science," January, 1924. Coal Production of Great Britain, 1920—254,060,302 net tons. Coal Production of United States, 1920—568,000,000 net tons.



Bituminous-Coal Output, Tonnage per Fatality from Falls and from All Causes, Total Fatalities

Though more tons of coal were mined per accident both from falls of roof and all causes in the late eighties and early nineties, we are doing better by far than in later nineties and in the first ten years of the present century. The safety campaign has done much. It is destined to do more. Not only is the downward swing in safety arrested but speaking broadly, overlooking the last two years an upward swing has taken its place.

ment, where slightly under 60 per cent of the men on coal are on pillars, the hazard from falls in pillar extraction, based on data in lines 6 and 7, is one-fourth of that on advance work; $(28 \div 41.7) \div (9 \div 58.3) = 4$.

In the third illustration, lines 8, 9 and 10, the hazard from falls is twice as great in pillar extraction as in advance workings.

The roof conditions at Gary are by no means better than the average, 11 per cent of the coal tonnage handled represents the actual quantity of slate that is hauled outside and dumped, in addition to fully as much more slate, rock and rash that is gobbled inside. The draw slate over the No. 3 Pocahontas Seam is particularly dangerous, holding "kettle bottoms," immediately over the coal, the shape of truncated cones ranging from 2 or 3 ft. to sometimes 10 or 12 ft. in diameter on the bottom.

When a place is first excavated, it is almost impossible to discover them, whereas in the second mining they have either partly settled in the pillar coal or dropped on the fallen coal before it is loaded out. These

Table No. I—Fatality Rates in Coal Mining Per 1,000 Employed

	Killed by Roof and Coal Falls		—Killed—All Causes—	
	Great Britain	United States	Great Britain	United States
1873-1882	1.12	1.44	2.24	3.18
1883-1892	1.00	1.25	1.81	2.68
1893-1902	0.76	1.48	1.39	2.98
1903-1912	0.74	1.73	1.33	3.72
1913	0.68	1.69	1.55	3.73
1914	0.70	1.48	1.15	3.22
1915	0.99	1.19	1.36	3.09
1916	0.89	1.33	1.32	3.09
1917	0.89	1.61	1.34	3.56
1918	0.86	1.70	1.39	3.38
1919	0.62	1.42	0.94	2.98
1920	0.55	1.43	0.88	2.89
1921	0.42	1.23	0.66	2.42
1922	....	1.06	....	2.32
Penna. Bit. 1916-1922	....	1.23	....	2.18

Figures for Great Britain from *Colliery Guardian*, March 9, 1923. Figures for the United States represent bituminous coal mines, from Coal Mine Fatality publications U. S. Bureau of Mines by Albert H. Fay and William W. Adams. Fatalities from falls of coal off ribs in the U. S. are about 2 per cent of the total fatalities and are included in the fatality rates for falls.

Table No. II—Fatalities From Falls of Roof and Roof Coal;
Pennsylvania Bituminous Mines, 1916-1922, Inclusive

Labor	Falls of Draw Slate (Pittsburgh Seam)	Falls of Roof Coal	Falls of Roof— All other Kinds	Total
Mining.....	113	17	176	306
Cutting with machine.....	19	4	22	45
Drilling or loading shot.....	16	1	22	39
Going back to shot.....	11	2	23	36
Pushing car or machine.....	10	1	16	27
Loading coal or rock.....	180	21	208	409
Taking down roof.....	67	2	74	143
Setting props.....	53	3	65	121
Drawing props.....	55	10	47	112
Traveling roadway.....	32	5	50	87
Working on track.....	9	4	30	43
All other falls of roof.....	3	..	..	3
Total.....	568	70	733	1,371

Does not include 181 fatalities from sliding coal, falling objects, etc. Arranged from Table XVI, "Statistical Analysis of Coal Mine Accidents in Pennsylvania 1916-1922, incl.," by Rush N. Hosler, Harrisburg, Pa.

conditions are met with careful and systematic timbering, based, on Colonel O'Toole's precept that all roof is dangerous. Close supervision of the men on coal and adequate lighting of the working places have also largely shared in greater safety from falls in pillar extraction.

Though the standing age of roof is universally recognized as a most important factor in roof-fall accidents, there are at present no actual figures to measure the direct relation to either accidents or fatalities in terms of lapse of time following excavation. It is a fact, however, that the more rapidly an area is worked the less is the danger from roof falls, and that the greater degrees of concentrated mining carry closer supervision and decreased exposure to the men.

The data in Table III, about Colonel O'Toole's mines, probably represents a far greater degree of concentration than any similar aggregate tonnage mined elsewhere, and it is known that the roof-fall accidents in pillars have been very largely reduced by those particular methods of working.

Properly used, mechanical loading will increase the possibilities of concentrated work. Over 2,000,000 tons

of coal were mined with the "Coloder" by the Pocahontas Fuel Co. with only one accident of any kind, and this case was a broken ankle. With the "Coloder" it is found that the timbering is less because the machine will load as much coal in an hour as two men will load in two or three days, and the machine will get out the coal before the roof has had time to settle. With the same roof conditions, in hand loading, the roof probably would fall at least once and would have to be cleaned up and retimbered before the coal could be loaded out.

Anything that will reduce the number of men employed and increase the output per man will reduce accidents, and as greater degrees of concentration in mining prevail with efficient application of machinery, accidents in coal mining are certain to decrease.

Washing Ribs Before Rock Dusting

T. G. Fear, general superintendent, Inland Collieries Co., Harmarville, Ind., in a recent letter says that it is not necessary to wash ribs before rock dust is deposited. If the rock dust is applied before the ribs and roof are entirely dry the dust will cake and the benefit of the rock dust will be entirely lost as far as the extinguishing of flame is concerned. The only benefit to be derived from the dust thus deposited on the rib is that by reason of the washing there will be no coal dust to propagate a flame.

The main shaft bottom at the Indianola mine was recently rock dusted. The double-track loaded side is timbered with steel I-beams, placed 5 ft. apart, and coal dust has been accumulating on these beams. When this place was rockdusted most of the coal dust was blown off the timbers and on the floor farther along. An examination of the ribs and roof along the main north entry does not show any deposition of coal dust, "this," says Mr. Fear, "proving my theory that the very fine coal dust when placed in suspension with fine rock dust makes a mixture that is precipitated to the floor."

Table No. III—Hazard in Pillar Extraction

Location	Fatalities from Falls					Fall Fatal- ities per Cent	In- side Men per Cent
	Draw Slate	Roof Coal	All Other Roof Falls	Coal From Face or Sides	All		
(1) In advance working places.....	104	7	132	23	266	48.9	59.7
(2) In pillar places.....	66	10	98	35	209	38.4	15.6
(3) All other places.....	24	..	44	1	69	12.7	24.7
(4) Total (1), (2) and (3).....	194	17	274	59	544	100.0	100.0
(5) Percentages in (4).....	35.7	3.1	50.4	10.8	100.0	..	..
United States Coal & Coke Co., Gary, W. Va., 1916-1920, inclusive, Production—21,869,964 net tons.							
(6) In advance workings.....	9	3	13	3	28	75.7	41.7
(7) In pillar places.....	4	1	4	0	9	24.3	58.3
Total (6) and (7).....	13	4	17	3	37	100.0	100.0
Company operating in four states, 1916-1920, inclusive, Production—43,995,007 net tons:							
(8) In advance workings.....	..	..	..	17	29.3	42.0	..
(9) In pillar places.....	..	..	..	34	58.6	34.0	..
(10) All other places.....	..	..	..	7	12.1	24.0	..
Total.....	..	..	..	58	100.0	100.0	..

Data in lines 1, 2, 3, 4 and 5 from Table XIX, "Statistical Analysis of Coal Mine Accidents in Penna., 1916-1922, incl.," by Rush N. Hosler, superintendent, Coal Mine Section, Pennsylvania Compensation Rating and Inspection Bureau, Harrisburg, Pa.; Table XX and XXIV same book and from supplementary information supplied by Mr. Hosler in correspondence. Mr. Hosler's data represents 1159, 1549 and 1743 in 1920, 1921 and 1922 respectively and in round numbers about 60 per cent of Pennsylvania's bituminous production or an approximate yearly average of 80,950,000 tons.

Practical Calculus for Home Study

To most engineers who have graduated from a mining college, calculus is a study long forgotten, but many problems yield readily to its use and occasionally the engineer needs to use it. To those who wish to study it or brush up on it a book entitled "Practical Calculus for Home Study," by C. I. Palmer, associate professor of mathematics, Armour Institute of Technology, is commended as calculated to serve to make that study pleasant and productive. The author makes his explanations plain and the subject intriguing. He illuminates a form of knowledge regarding which American engineers have been only too indifferent but which will amply repay study. The book measures 4½x8 in., has 443 pp. and costs \$3. The publisher is the McGraw-Hill Book Co., 370 Seventh Ave., New York City.

MILL TAILINGS from the concentrator at Morenci, Ariz., of the Phelps Dodge Corporation, are being used for rock dusting the coal mines of that company near Dawson, N. M. The tailings are sacked and shipped to Dawson. No rock is being ground for the dusting of these mines.

Mining Industries Especially Are in Need of Trade Associations*

The Truth About Profits, Breadth of Ownership and Variations in Costs Between Mines Should Be Taught the Public—Internal Affairs Need Association Service Too

BY GOLDTHWAITE H. DORR
New York, N. Y.

THE natural-resource industries employ something like a million and a half men and probably seven millions of our population are directly dependent on them for a livelihood. In terms of dollars, the annual flow of this stream meters well over four and a half billion. The number of those who as stockholders are furnishing the billions of capital necessary for the conduct of these enterprises probably is almost as great as the number of persons employed in those industries.

Some of us had occasion a year ago to gather statistics which showed with reasonable assurance that there are substantially 350,000 individuals who are direct investors in the bituminous-coal mines alone. Much of the capital in these natural-resource industries is furnished by bondholders and other indirect investors, so that the actual number of persons whose savings are at stake in their sound and successful conduct equals, as has been said, the number of wage earners employed in them. If people could be made to see this fact many misunderstandings of the public would be resolved that now create the gravest problems of trade associations in natural-resource industries. The public does not know the business facts of these industries.

It is the prime field of usefulness of a trade association to collect and distribute the facts of the industry—facts useful to the industry itself in the intelligent operation of its business, useful to the consumer in the intelligent operation of his business, useful to the public in understanding conditions in the industry and making decisions as to its own relations with that industry. But during the last four years public opinion and government have challenged the very exercise of this vital function of trade associations. Why do business men and economists fight for the exercise of this function? Why has it been attacked?

There has been in the last quarter century nothing short of a revolution in the conception of business by business men. Their horizon has widened enormously. Development of industry and the pressure of competition, national and international, has led to a conception

of business as a science, in which the careful analysis of all available facts is taking the place of rule-of-thumb, hit-or-miss methods.

Efforts have always been made by business men during times of broadening markets to find out what others were doing, but the very absence of normal means for mutual information led to mutual distrust and to the use of questionable methods. This situation, which rendered business highly speculative and which was fraught with disaster to producer and consumer alike through ungoverned fluctuations, grew intolerable with the broadening markets in the decades after the Civil War. To escape from it business men at the end of the nineteenth century turned to the creation of combinations and huge corporations, which through their

THE TRADE ASSOCIATION'S "COMEBACK"

Although vilified and blamed for profiteering and almost scrapped after the war, the legitimate trade association is now compelling itself upon industry and business by sheer merit, Mr. Dorr thinks. No less an authority than the U. S. Supreme Court is finding for it, as in the glass and sugar exchange cases last winter. It is now for the trade association to rise to the place that awaits it, especially in an industry composed of so many small units as is the coal industry, and satisfy the demand of business men for less blind recklessness and more science in their affairs.

very size would have the necessary information to steer a sound business course. This tendency toward single large units probably would have fallen of its own immensity had its collapse not been brought about by the Sherman Anti-trust Law. It soon was discovered that on the whole it was more in accord with the genius of American institutions that there remain the initiative and competitive activity of smaller units.

But the need for facts—the common interest in having the facts in order that business might be conducted not as a poker game but in accordance with the scientific genius and bent of our people and of the age—made business men recognize that there was a common interest in gathering these facts. This led to the trade association. The need for their service, the sound economic results to be obtained were, before the Great War, clear to officers of government, the courts and business men alike. Indeed, the Federal Trade Commission at the start carried out the purpose for which it was set up—that of leader, helper and guide to business—by emphasizing, preaching and encouraging the trade-association movement, the collection and dissemination of current business facts.

But for the Great War the orderly development of this movement, it is fair to say, would have gone on. During the war industry generally came under the control of the government. At the end of the war, when that control was released, the inflation which had occurred during the war was followed by a secondary

*An article constructed from an address delivered by Mr. Dorr before the natural resources production division of the United States Chamber of Commerce, Cleveland, Ohio, May 7.

period of still more extravagant inflation. Prices soared far beyond both war and pre-war levels. A general feeling of resentment spread through the country. Looking around for a cause of high prices the people blamed trade associations at once and charged them with some responsibility for profiteering.

As a result of a post-war witch-burning spirit, the trade association, a great accomplishment of American business men, a great piece of economic machinery, capable of serving producer and consumer alike, was attacked, vilified, discredited and almost scrapped. But I venture to say, that the tide has turned.

The Supreme Court during the past winter, twice has rejected unanimously the extreme interpretation of the Department of Justice of the Sherman Law in the important Glass and Sugar Exchange cases. There is no decision of the Supreme Court which holds that the collection and dissemination of trade information on the principles laid down by Secretary Hoover is in itself a violation of the Sherman Law, and I am prepared to venture the opinion that there never will be.

The particular facts common to natural-resource industries and having a direct bearing on trade-association activities in these industries should be reviewed.

ASSOCIATIONS CAN SERVE A COMMON INTEREST

Natural-resource industries are wasting industries. The most valuable mines will one day be worthless. From this it follows that methods of production and distribution and the economic organization of the industry should not be wasteful of the natural resource. Though the offense against conservation is more often waste in consumption than in production, nevertheless there is here a common interest within the industry itself and in the nation at large that trade associations in these industries should serve.

The interchange of technical information, so that the best available practices shall prevail, is important, and in this the trade organizations have been and can be of service, but there is the more fundamental problem that the industry shall not be so organized that there shall be in it recurrent extremes of oversupply and shortage. These produce a wastefulness in the production of the natural resource itself and of the nation's capital. To a solution of this phase of the problem the trade association can also contribute by the gathering and dissemination of trade information.

A second circumstance is that in these natural-resource industries there are multitudes of owning and producing units scattered over an enormous territory, often remote from market and having little opportunity to gauge market conditions correctly. In bituminous coal, for example, there are over six thousand separate organizations. The larger units, perhaps, can, from their own wider experience, gauge business conditions with reasonable accuracy, but the large number of small units are at a disadvantage unless the facts of the industry as a whole can be collected and disseminated among them through trade-association activities.

Third, there probably is keener and fiercer competition in natural-resource industries than in any other industries of the United States, and this competition often is carried to extremes that are destructive of the interests of owner, worker and consumer alike.

The public misconceptions which prevail as to the existence of competition in natural-resource industries are remarkable. We have the familiar popular myth of the coal trust in the bituminous industry, which

probably still persists in spite of ruinous prevailing prices and the finding of the Coal Commission that the industry is highly competitive, and that such periods of price inflation as have occurred were not in any way due to combination but to shortages in supplies due to the stoppage of production by strikes and transportation difficulties.

Trade associations in natural-resource industries can perform a very definite service in gathering and keeping before the public the facts as to their competitive nature; ultimately these facts will sink in.

Further, to a large extent the products of the natural-resource industries are standardized articles which under normal economic laws are bound to sell at uniform prices at the same time in the same market. No one factor has been more unintelligently used in the attack on trade associations during the last four years than the argument that because prices were uniform at the same time in the same market, therefore such uniformity was the result of combination and of the secret action of trade associations in these industries.

There are not many things on which all economists agree, but if there is one principle as to which there is complete agreement it is that standardized articles will be offered in the same market at the same price by substantially all competitors, and that if a shift in price level is made, whether up or down, by any competitor controlling an important part of the production, there will follow almost simultaneously a similar advance or recession in price by his competitors.

This economic law is merely the expression of economic observation of what takes place in any free market, whether in the market square of an old English town or in the national and international markets of the great standardized products of today. And yet men have been under indictment and tried criminally in the last few years for alleged combinations to control prices, upon no other basis than the fact that their industries were governed by this economic law.

Happily, the Supreme Court of the United States, in a recent case, seems to have recognized the existence of this economic principle in a way which will hereafter be extremely useful to industry in clearing up this fundamental misconception.

PHYSICAL DIFFERENCES AFFECT PRODUCTION COST

Finally, there is the significant fact peculiar to natural-resource industries that there results from the actual physical difference in the natural resource a wide difference in the actual operating cost of production. Here is what has happened: The wider margins between operating cost of production and selling price of the physically better mines have frequently been taken as typical of the industry as a whole. Looking merely at these prices, the public clamors that prices are extortionate and the result of combination, when analysis will show them to be normal competitive prices.

A fair test of whether a prevailing market price is a normal competitive price is whether or not a substantial portion of the product is being produced at or about cost. It is obvious that if the price falls below that point, before long a substantial part of production will cease, and the public will not get the material which it needs. If it rises above that point, new producers come into the business and the supply is abnormally increased.

If the facts of any of the natural-resource industries be analyzed for any substantial period of time, it can

be made entirely clear to the public that the prices in those industries are normal competitive prices. If they vary from normality, it will be more often that they are abnormally low than abnormally high.

For example, take soft coal: Last summer we succeeded in prevailing upon the U. S. Coal Commission to analyze the margin between operating production cost and sales price. For the year 1921, in sixty-seven bituminous fields more than 20 per cent of the tonnage was sold, not at or about the cost of production but actually below it; in twenty-one of these fields more than 50 per cent of the coal was so sold.

In a group of mines which had been operating continuously for ten years prior to 1917 and which had thus established their ability to live we found that, during this period, mines producing on an average of 19 per cent of the tonnage sold their product on an average at cost or less.

Those who are familiar with the natural-resource industries are well aware that this situation is not peculiar to the bituminous-coal industry but that an analysis of sales price and cost of all the natural-resource industries would show that a substantial amount of the product which the public requires is produced without margin between cost of production and sales price, or at an actual loss.

The gathering and analysis of figures along these lines can be made absolutely to convince the public that the prices prevailing in natural-resource industries are the normal prices of a highly competitive industry and which must prevail in order to obtain for it the product from them that it requires.

If price fixing were adopted by the government, it follows that price could not be set at a figure lower than that now obtained by competition. It is wholly unfair, therefore, either to take the margins between the operating cost of production and this normal competitive selling price which are obtained by the operators of the physically superior properties as typical of the industry or to denounce the operators of those properties as profiteers by reason of the wider margin they obtain.

HIGHER QUALITY ENTITLED TO BETTER PRICE

What is such an operator to do? Is he to sell his product at a price below the competitive market price? Does the producer of wheat on a rich bottom land sell his wheat at a price lower than that of his rival on a difficult upland because he gets more bushels from the acre with less labor cost?

The wider margin of the producer who has a physically superior mine or farm does not indicate that he is making a higher rate of profit, for the rate of profit that he earns is determined by the ratio of his margin between selling price and operating cost to the value of his property. The superior quality of his natural resource, whether it is a farm, a mine or a corner lot, means that it is worth proportionately more, and, ex-

cept in the case of the original appropriator, that he has, therefore, paid more for it.

Some have definitely urged that the government go back to the original expenditure made in the acquisition of any property, whether a mine, city real estate or a farm, and permit merely a return of 6 per cent on that original cost. This proposal is foreign to our whole scheme of economic life. Ownership of mines, farms and city real estate in our economic civilization is constantly changing on the basis of the present value of the property purchased. To restrict the valuation of the investment of the present owners of natural resources, whether land, mines or forests, to the actual expense to the original appropriator in the remote past would mean the taking of property from the present owner without compensation.

Further, there is this practical consideration: The development of our natural resources has been made with the expenditure of an enormous amount of individual initiative, hard work and actual sinking of savings;

an enormous amount of this has reaped no reward whatever. It is only the hope of realizing a considerable reward, if successful, that has induced men and women to make the sacrifices they have made in the development of our natural resources. If that incentive for venturing were taken away, the net result to the public would be such a slackening of development of new properties as to result in a diminishing supply and far higher prices.

These facts, the A, B, C of anyone engaged in a natural-resource industry, are not clear to the public generally, but they are of such a simple and elementary nature that it should be possible to make them clear, and it should be the task of the trade associations, as representative of these industries, to gather the necessary facts and bring them home to the public.

Coal-Mining Industry Uses 87 per Cent Of Black Powder Output

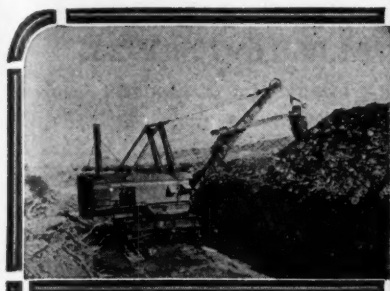
The production of black blasting powder in 1923 is reported as 8,078,053 kegs, or 201,951,325 lb. This compares with a record production of 11,084,741 kegs, or 277,118,525 lb., of black blasting powder in 1917, according to a report by the Bureau of Mines.

Pennsylvania led in the consumption of black blasting powder, using 39,127,575 lb. Illinois, with a consumption of 37,179,825 lb. ranked second; Indiana, with 21,344,100 lb., was third; Kentucky, with 17,180,175 lb., was fourth; and West Virginia, with 14,817,050 lb., was fifth.

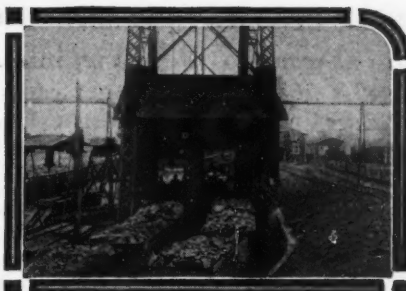
Of the total consumption of permissible explosives, 56,806,709 lb. was used in coal-mining operations, and of high explosives, other than permissible, 37,828,979 lb. was used in coal-mining operations. Of the total black blasting-powder production, 7,019,550 kegs or 175,488,750 lb., constituting approximately 87 per cent of the output, was used in coal-mining operations.

A CURE FOR "COAL BARONISM"

The American public probably does not know the story of coal, in spite of much recent publicity. It probably doesn't know that in 1921 20 per cent of the output of sixty-seven coal fields sold at less than cost and in twenty-one fields the proportion was 50 per cent. It doesn't know that a group of mines whose existence was sufficiently justified to keep them running during the ten-year period before 1917 sold 19 per cent of their product at a loss. Facts like these, if properly presented, should quiet the perennial public clamor for lower priced coal, Mr. Dorr thinks, and coal-trade associations ought to do the presenting.



News Of the Industry



Ascribe Loomis Blast to Electric Trolley Motors And Cigarette Smoking

Special Dispatch to Coal Age

Scranton, Pa., June 27.—State mine inspectors in their report to Joseph J. Walsh, Secretary of Mines, on the explosion at the Loomis colliery of the Glen Alden Coal Co., Hanover township, on June 6, which resulted in fourteen fatalities, ascribe the explosion to the use of electric trolley motors and the failure of employees to observe the anti-smoking regulations.

The inspectors declared they found the electric trolley motors in use in gaseous sections of the mine and discovered cigarette butts and burned match stems in the debris caused by the explosion.

The report by the mine inspectors confirms in part a report made by official investigators for the company who worked with and at the same time as the mine inspectors in seeking the cause of the explosion. The company investigators declared that the explosion was traceable only to the failure of the men to observe the "no-smoking" rule in the mine. This was based on the discovery of burned matches and cigarette butts.

An official of the company, who took a prominent part in the investigation declared that the use of electric trolley motors in the operation could not be ascribed as the cause of the explosion. He pointed out that no electric trolley motor was in operation in the section of the mine affected by the explosion at the time.

Among local coal mining men it is thought that the inclusion of the electric trolley motor as a cause of the explosion may have been written into the report by the mine inspectors to aid Secretary Walsh in his campaign against the use of electrically operated machinery in underground workings. Mr. Walsh has time and again protested against the operation of such equipment as electric trolley motors.

British Coal Output Nearly At Pre-War Level

Nearly 71,333,000 tons of salable coal was mined in Great Britain in the first quarter of the current year, as compared with 71,667,000 tons in the previous quarter and 70,000,000 tons in the corresponding quarter of 1923, and about 73,000,000 tons in 1913. Shipments of coal abroad, exclusive of shipments to the Irish Free State, according to the Bankers Trust Co., amounted to 19,390,000 tons. This was about

Democratic Platform's Plank on Mining

The Democratic presidential platform, adopted by the convention at New York June 28, does not contain a separate coal plank like that of the Republican party. The section on mining, which includes coal, is as follows:

"Mining is one of the basic industries of this country. We produce more coal, iron, copper and silver than any other country. The value of our mineral production is second only to agriculture. Mining has suffered like agriculture, and from the same causes. It is the duty of our government to foster this industry and to remove the restrictions that destroy its prosperity."

4,667,000 tons less than in the previous quarter and 2,750,000 tons less than the quantity shipped in the corresponding period of 1913. The quantity available for consumption at home was 49,200,000 tons, or 4,667,000 tons more than the quantity similarly available in the corresponding period of 1923 and 1,500,000 tons more than the quantity available in the first quarter of 1913.

The reduction in the quantity of coal exported was due to a fall in the demand from the Continent, caused in a large measure by the general resumption of work in the mines in the Ruhr coal fields. This substantial decrease in the foreign shipments was not accompanied by a general downward movement in prices. On the contrary, prices on the whole were well maintained and quotations for immediate delivery were higher at the end than at the beginning of the quarter. The mines were worked for 71.29 days out of a possible 78 days.

There was a slight improvement in the regularity of employment in the coal mines. In the first quarter of 1924, 1,206,000 persons, including clerks and salaried persons, were employed in and about the mines, an increase of over 7,000 on the previous quarter and of 89,000 over the number employed at the outbreak of the war. The earnings of workers in the first quarter of the year were rather less on the average than in the previous quarter. However, they were higher than in the first quarter of 1923. There were 310 persons killed and 1,316 persons seriously injured by accidents in and about coal and metalliferous mines. This compares with 313 killed and 1,358 injured in the corresponding quarter of 1923.

Lease of Norfolk & Western By Pennsylvania Deferred

Lease of the Norfolk & Western R.R. by the Pennsylvania has been deferred, according to a statement by Samuel Rea, president of the Pennsylvania, following the meeting of the board of directors of that road, June 25. "The committee appointed by the Pennsylvania R.R. to consider a lease of the Norfolk & Western," Mr. Rea said, "reported to the directors that it had not reached any satisfactory conclusion on the subject and that further consideration of the matter should be deferred."

This statement followed one by A. C. Needles, president of the Norfolk & Western, the previous day to the effect that the Pennsylvania committee had made no offer for the lease of the property. Both railroads appointed committees to consider the lease, but so far as is known no joint meetings have been held.

First mention of the lease was made by the Pennsylvania to the Interstate Commerce Commission more than a year ago. Officials of the railroad made it clear at that time that the Pennsylvania, which owned a controlling interest in the Norfolk & Western, intended to lease it with the approval of the commission.

According to those in touch with the situation the careful consideration of the problem of leasing the Norfolk & Western convinced some of the members of the board of directors of the Pennsylvania that it would be a costly undertaking. These directors opposed the lease under present conditions. In the New York financial district the opinion was expressed that the announcement made by President Rea was to be taken simply as indicating that the lease would not be given serious consideration until next autumn.

Sues Union for \$250,000

Mrs. Edna M. C. Major, widow of John I. Major, who was shot to death June 22, 1922, while employed at the Lafferty mine of the Union Coal Striping & Mining Co., filed suit, June 25 in the court at St. Clairsville, Ohio, for \$250,000 damages against the miners' union.

The petition is directed against the United Mine Workers of America, John L. Lewis, president, and William Green, secretary; District No. 6 of the organization, its officers, and Subdistrict No. 5 of District No. 6 and its officers.

According to the petition, Major came to his death at the hands of union miners.

Peace River Coal Almost Equal to West Virginia's

There is good coal in the Peace River region of northeastern British Columbia—"practically the equal to the high-grade coals of West Virginia and Wales"—according to J. D. Galloway, Canadian Government engineer. Reporting on a long trip of investigation he made several months ago through the territory around what is known as the Peace River Block, he said that the coal is there and mining conditions should be good because of strong roof and floor. All the region needs is transportation and market. The nearest rail line is the westward extension of the Edmonton, Dunvegan & British Columbia R.R., more than 100 miles away. Says he:

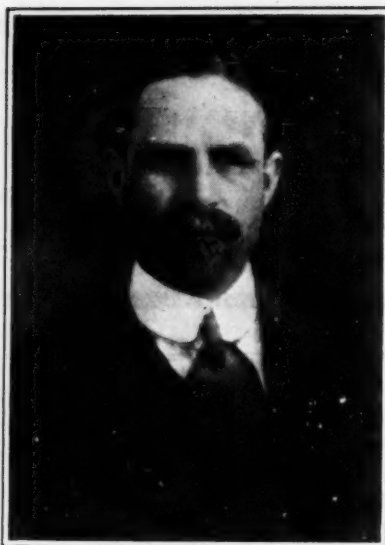
"The Rocky Mountain Canyon coal field has been known for many years; leases were taken up in the area by Neil Gething as long ago as 1908. At the present time a syndicate consisting of Neil Gething, George Aylard, and R. F. Green holds forty leases, and another twenty are held by W. S. Johnston. In the immediate vicinity of the canyon no other leases have been taken up, and as the coal is under reserve none can be taken up at the present time. On the Carbon River, thirty miles above the head of the canyon, ten leases are held by C. F. W. Rochfort and partners.

Strata Notably Regular

"One noteworthy feature of the field is the regularity of the measures. The freedom of the strata from any serious disturbance can be well seen along the canyon, where they extend for miles with almost regular strikes and dips. Dips of from 7 deg. to 15 deg. largely prevail, but in a few places the short limbs of small folds have dips up to 35 deg. Faults are almost entirely absent and the gentle folding of the strata which occurs in a few places is not such as to interfere appreciably with mining operations. It may be safely said that the structural conditions of the measures are such as to make mining operations almost ideal. As a rule the enclosing sandstones and shales above and beneath the coal seams are firm and solid, so that good mining conditions would generally prevail.

"The coal is of high grade. Most of it comes under the classification of semi-bituminous or high carbon coal. Apart from its high-carbon content this coal is noteworthy for its low ash content, which on the average is considerably lower than any of the coals now being mined in western Canada. The high rank of this coal, together with the low ash, makes it altogether an exceptional coal and practically the equal of the high-grade coals of West Virginia and Wales. Most of the coal in this area is non-coking, although certain bands within some seams and certain small seams are fairly good coking coal.

"Two more or less distinct types of coal occur in the field and in many instances a seam will contain a band of each kind of coal. The predominating type, which occurs in far the greater amount, is a hard, firm coal which is



Goldthwaite H. Dorr

Legal adviser of the Bituminous Coal Operators' Special Committee last year, whose address on trade associations, delivered at the annual session of the United States Chamber of Commerce, appears on another page.

dull, grayish and frequently greasy in appearance. This coal would easily stand long transportation without unduly breaking up. The analyses show it to be a high-carbon bituminous coal, with a fixed carbon content of from 70 to 80 per cent.

"The second type of coal is a bright-colored, jet, friable coal, which easily and readily breaks into small fragments. It frequently occurs as a bottom bench, from 6 to 12 in. thick, of a seam containing an upper, generally thicker bench of the dull coal. The jet coal usually is bituminous in rank and it has been found to be excellent blacksmith coal. It has a somewhat higher ratio of volatile combustible matter to fixed carbon than the dull coal and is generally fair coking coal.

"Various estimates of tonnage of coal in the Rocky Mountain Canyon field have been made, but in conclusion, it is enough to say that the tonnage and quality of coal in this field is quite satisfactory and all that is required is transportation and market."

Coal Towns Safe and Sane

The Pacific Coast Coal Co. is not moved by any diabolical desire to ruin the Fourth of July for the boys of its coal towns. Coal towns will burn, however. Therefore the company has issued orders against all sorts of fireworks and explosives for Fourth of July use. Says a company statement posted at Black Diamond: "A fire might wipe out a town or do such damage that a mine would have to close down, throwing all in camp out of work. At this season of the year, when everything is so dry, the danger of fire is intensified and extra precautions must be taken. It is urgently requested that parents explain to their children why this precaution must be taken."

Reading Coal Co. Earned \$4,068,694 in 1923

The Philadelphia & Reading Coal & Iron Corporation and its subsidiaries report gross sales of \$89,195,635 for 1923, against \$52,786,120 in 1922. After allowing for all expenses and other deductions, the company reported operating income of \$10,512,976 against \$2,261,415. After crediting other income, and allowing for depletion, taxes and other charges, the company shows net income of \$4,068,694, against a deficit of \$93,430 in 1922. The net income for 1923 was equal to \$2.90 a share earned on the 1,400,000 shares of no par value capital stock outstanding. In his statement to stockholders W. R. Richards, president of the corporation, said in part:

"Total production of anthracite from lands owned, leased and controlled by the Philadelphia & Reading Coal & Iron Co., for the year ended Dec. 31, 1923, was 11,488,513 tons, compared with 6,924,284 tons mined during the previous year. The company mined 10,222,202 tons and sold 9,835,474 tons as compared with 6,100,869 tons mined and 7,398,974 tons sold the previous year. Low tonnage of 1922, both as to production and sales, is attributed to the 1922 strike.

"The funded indebtedness has been reduced by payment of Philadelphia & Reading collateral sinking fund loan of \$30,000. Reforestation of lands is progressing favorably. During the year 225,000 young trees were planted and protective measures for elimination of danger of forest fires are now being carried forward energetically."

West Virginia Mines Yielded 87,031,408 Tons in 1923

West Virginia coal mines produced 87,031,408 gross tons of coal in 1923, according to figures compiled by the State Department of Mines. The output by counties, compared with 1921 and 1922, was as follows, in gross tons:

County	1921	1922	1923
Barbour.....	1,548,949	817,057	2,149,618
Boone.....	1,475,721	958,912	1,388,562
Braxton.....	235,537	213,108	292,144
Brooke.....	1,574,050	1,369,276	1,741,258
Clay.....	488,778	741,608	694,813
Fayette.....	7,846,189	4,418,605	7,386,368
Gilmer.....	86,884	115,808	96,879
Grant.....	242,712	74,663	140,675
Greenbrier.....	52,153	475,601	431,643
Harrison.....	5,247,547	2,629,886	5,568,930
Kanawha.....	5,209,368	2,424,518	4,612,552
Lewis.....	67,266	115,808	99,625
Lincoln.....	272,994	160,309	134,287
Logan.....	10,367,205	13,645,970	10,679,024
Marion.....	5,019,933	1,230,668	5,044,613
Marshall.....	1,067,241	1,116,798	1,506,813
Mason.....	242,480	48,253	80,203
McDowell.....	15,124,423	15,180,421	14,215,518
Mercer.....	2,325,396	3,174,504	2,508,492
Mineral.....	367,148	157,515	443,642
Mingo.....	1,095,828	2,061,210	2,928,860
Monongalia.....	4,398,929	5,764,558	6,372,937
Nicholas.....	212,086	284,818	368,587
Ohio.....	1,418,053	1,310,830	1,872,528
Preston.....	1,439,506	939,869	2,182,164
Putnam.....	260,102	170,552	365,047
Raleigh.....	7,728,329	7,518,550	7,688,452
Randolph.....	775,869	369,730	702,554
Summers.....	27,818	7,915	17,490
Taylor.....	759,236	310,798	796,005
Tucker.....	1,068,257	478,134	712,830
Upshur.....	599,335	525,555	798,715
Wayne.....	56,344	69,206	172,351
Webster.....	5,238	16,908	39,288
Wyoming.....	1,329,700	1,481,103	1,534,351
Small mines.....	700,000	700,000	1,000,000
Total gross....	80,756,604	70,888,203	87,031,408

Imports of U. S. Coal Exceed British at Rio de Janeiro

Imports of coal at Rio de Janeiro during February, 1924, according to a report by Consul General A. Gaulin, Rio de Janeiro, amounted to 55,351 metric tons, in comparison with 56,513 and 47,640 during the corresponding months of 1923 and 1922. This is the first month since the middle of 1923 that the United States leads in the Brazilian coal imports, 30,567 metric tons having come from that source and 24,784 from Great Britain. The following table shows the coal imports at this port during the first two months of the years 1922, 1923 and 1924, in metric tons:

	1922	1923	1924
United States	13,772		78,468
Great Britain	76,515	109,006	88,919
Totals.....	90,287	109,006	167,387

Conferences at 19th Hole?

What is believed to be the first golf course for "miners only" has just been established by men at the Powderly colliery of the Hudson Coal Co. in Carbondale, Pa. The course can be used free of charge by all of the 22,000 Hudson Coal Co. miners in the section.

During the month under review the coal imports were classified as follows: 40,768 tons of steam coal, 13,964 tons of gas coal and 619 tons of foundry coke.

Of the coal from the United States, 24,195 tons was shipped from Norfolk and 6,372 tons was loaded at Philadelphia.

Navy Awards More Contracts

Additional contracts for bituminous coal for navy yards and naval stations during the fiscal year beginning July 1 have been announced by the Bureau of Supplies and Accounts, Navy Department, on the basis of proposals opened May 21, as follows:

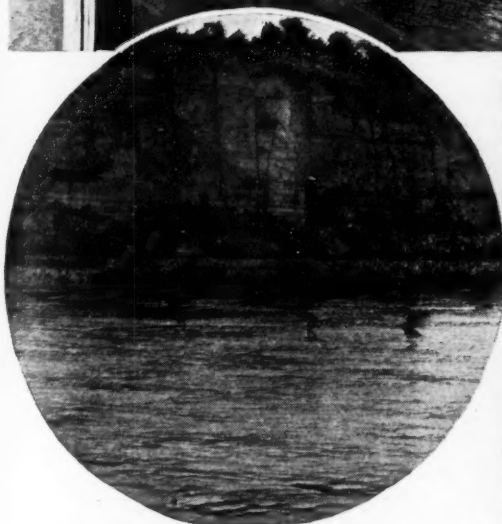
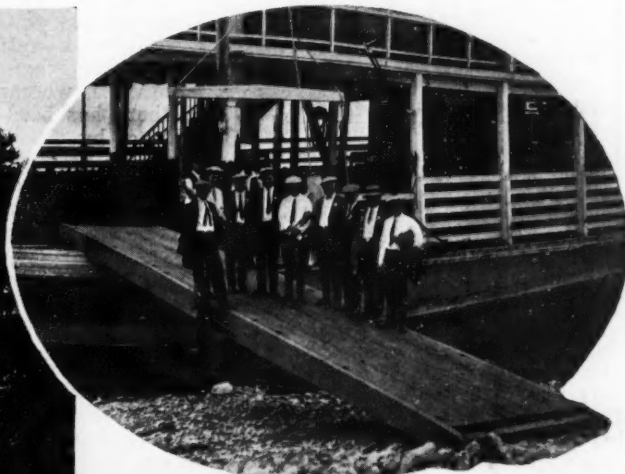
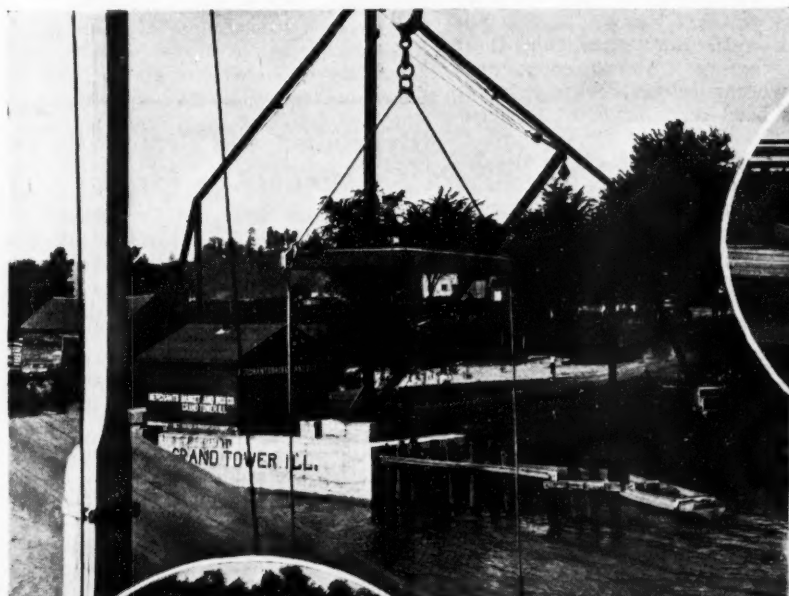
Coleman & Co., Inc., Philadelphia, 20,000 tons for delivery at New York at \$5.37 delivered under chutes, \$5.57 delivered alongside vessels and \$6.37 delivered in New York harbor and unloaded.

New England Coal & Coke Co., Boston, 30,000 tons run of mine for delivery at Boston, at \$5.85.

Maryland Coal & Coke Co., Philadelphia, 25,000 tons run of mine for delivery at Philadelphia, at \$4.90.

W. C. Huber & Co., Philadelphia, 35,100 tons run of mine for delivery at Annapolis, at \$5.19.

Sidelights on the Three-Day Cruise of the Illinois Mining Institute on the Mississippi River



A Mississippi River Metropolis Where the Illinois Mining Institute Made a Landing

At Grand Tower, near a new gigantic power plant supplying current for many southern Illinois mines, the party went ashore, rode inland 12 miles and visited the plant of the Atlas Powder Co.

There Are Some Palisades Along the Mississippi

Rock walls 50 ft. high form the west bank of the Father of Waters for several miles below St. Louis, Mo., where the Illinois Mining Institute's boat trip started June 12. Most of the banks are just plain mud, however, on which the shallow-draft steamboats can shove their bows with ease to pick up passengers or freight.

Parts of "The Gang" Going Aboard After a Stop at Cairo, Ill., World's Hottest Town

When the boat gets under way a gentle wind sweeps from end to end of the meeting room. Moreover the conventions which restrain one in a session in the ballroom of a hotel hamper no one on a river boat, and if perhaps there is less order there is more comfort and a larger degree of bonhomie.

All Out! End of the Line!

Here we see the Illinois Mining Institute debarking on the old river levee at St. Louis, Mo., Sunday morning, June 15, after three days of cruising down to Paducah, Ky., and back.

Delay Costs Lehigh Valley Stockholders \$600,000

Holdings of 18,000 shares of Lehigh Valley R.R. stock have lost \$600,000 through their failure to exercise within the required time limit their right to subscribe for stock of the Lehigh Valley Coal Co. under the segregation plan of the two corporations, as ordered by the U. S. Supreme Court.

The stockholders were entitled to one share of coal stock at \$1 each for each share of railroad stock owned. The market price of the coal stock is \$34 a share. The railway company mailed out the rights three months ago, fixing the time limit for exchange at 3 P.M. Monday, June 16, 1924. The owners of 18,000 shares failed to execute their rights by that time and this stock now goes to the coal company at \$1 a share.

Since the expiration of the time limit some of the tardy stockholders have sent various excuses to the trustees. The executor of an estate holding 120 rail shares said that he was "away and ill." His delay was said to have cost the estate \$10,560.

Italy Imports More Coal From the United States

During the first quarter of the current year Italy imported 155,508 tons of coal from the United States against only 160 tons for the same period in 1923 and 50,000 tons in 1922, according to advices to the Department of Commerce from Commercial Attaché McLean, Rome. This increase, despite the relatively small quantity involved, is significant, reflecting the results of persistent efforts on the part of new firms to introduce American coals on the Italian market, Mr. McLean states. The keenness of British competition has been considered by many to be insurmountable, but the figures speak for themselves and of late a number of American coal firms have been showing a growing interest in the possibilities offered by the Italian market.

During the full calendar year 1923 the United States shipped 486,112 tons of coal to Italy against 128,443 tons, in 1922. If exports are maintained for the remainder of the current year at the same rate as during the first quarter the total for 1924 will be 620,000 tons.

Italy's total imports of coal for the first three months of 1924 were slightly below the figures reached in 1923. The following table shows the shipments by the various countries in tons:

Italy's Imports of Coal by Countries

Country	First Quarter		
	1924	1923	1922
France.....	123,533	111,295	73,019
Germany.....	123,412	19,533	22,766
Germany (reparation).....	298,353	482,372	450,275
Great Britain.....	1,262,334	1,447,179	1,136,112
Jugoslavia.....	3,882	4,287	1,573
United States.....	155,508	160	50,381
Others.....	6,899	3,116	6,231
Totals.....	1,973,921	2,067,942	1,740,357

Lehigh Valley Coal Miners Abjure Outlaw Strikes

Scranton, Pa., June 30.—Having voted to outlaw petty strikes in the future, miners employed by the Lehigh Valley Coal Co., last night announced their intention of seeking an immediate conference to impress upon officials of the company their desire to observe the conditions of the existing wage agreement.

The menace of petty strikes to which the anthracite industry has been exposed is being eliminated, the spokesman of the general grievance committee of the Lehigh Valley miners declared. He endorsed the action of President John L. Lewis in sending an investigation committee to the hard-coal fields.

During the past week general grievance committees representing the following companies voted to refrain from calling petty "outlaw" strikes: Pennsylvania and Hillside, Glen Alden, Hudson and Lehigh Valley. Under the terms of the promise, the men at operations of these companies will not quit work until they have laid their troubles before accredited union officials, who will then decide whether there has been a violation of the contract by the operators.

The promises were made to the investigating committee which attended all of the meetings of the general grievance committees.

A. I. M. E. Perfecting Program For Birmingham Meeting

Arrangements for the autumn meeting of the American Institute of Mining and Metallurgical Engineers, at Birmingham, Ala., Oct. 13, 14 and 15, are well under way, the following tentative program having been arranged:

A special train will leave Washington Oct. 7 at midnight for the Shenandoah Valley, stops being made at Luray, the Grottoes of the Shenandoah and Natural Bridge. The evening of the 8th will be spent at Roanoke.

On Oct. 9 the party will breakfast while following the banks of the New River on the way to the Pocahontas coal fields of West Virginia. The day will be taken up with a trip through the field, stops being made at some of the mines and tipples and provision being made for those desiring to go underground. A smoker and dance will be given at Bluefield in the evening.

The morning of Oct. 10 will be spent at the Mascot Mines of the American Zinc Co. of Tennessee, with an opportunity for going underground and to examine the mill and byproducts plant. In the afternoon the party will inspect the marble quarries and mills in the vicinity of Knoxville. The next day, Oct. 11, will be devoted to inspection of the mines, mills, smelters and acid plants at Copperhill and Ducktown.

The first day of the meeting at Birmingham will be devoted to technical sessions, morning, afternoon and evening. The mining of coal and iron in Alabama and the smelting practice of the Birmingham district will be the main topics of discussion, but opportunity will be afforded for the presentation of other subjects.

Reduction in Insurance For Rock Dusting

Per \$100 of Pay-roll, Cents		Per \$100 of Pay-roll, Cents	
State	Cents	State	Cents
Alabama	20	Michigan	10
Colorado	20	Montana	13
Georgia	10	New Mexico.....	20
Illinois	10	Oklahoma	20
Indiana	10	Tennessee	11
Iowa	10	Texas	10
Kansas	13	Utah	14
Kentucky	18	Virginia	10

If for instance, the rate for a mine has been \$3 and it is located in Alabama, the rate will be reduced to \$2.80 if the mine is properly rock dusted. The saving will be somewhere around \$6 per day. Pennsylvania, Maryland, Ohio and West Virginia, which are state-fund states, are not included in this list. The Inspectors' Committee of the Pennsylvania Rating Bureau has recommended, it is understood, that the deduction be placed at 10c. in that state. The figures have been determined upon the history of mine explosions in the several states.

Byproduct and Beehive Coke Output Low for May

Production of both byproduct and beehive coke declined during May, due principally to a sharp decrease in the output of pig iron. The quantity of byproduct coke produced was 2,786,000 net tons against 3,010,000 tons in April. Production of beehive coke declined from 1,079,000 to 761,000 tons. In terms of per cent the decrease was sharpest for beehive coke, next for pig iron, and last for byproduct coke. The output for beehive coke fell off 29 per cent, the output of pig iron 19 per cent, and the output of byproduct coke 7 per cent. The average daily production of byproduct coke was 89,855 tons as against 100,326 tons in April, a decrease of 10.4 per cent. Of the 71 plants in existence, 66 were active and 5 were idle. The ratio of production to capacity was 74.5 per cent.

Monthly Output of Byproducts and Beehive Coke in the United States*

(In thousands of net tons)

	Byproduct Coke	Beehive Coke	Total
1917 monthly average..	1,870	2,764	4,634
1918 monthly average..	2,166	2,540	4,706
1919 monthly average..	2,095	1,638	3,733
1920 monthly average..	2,565	1,748	4,313
1921 monthly average..	1,646	462	2,108
1922 monthly average..	2,379	714	3,093
1923 monthly average..	3,127	1,497	4,624
March, 1924.....	3,221	1,343	4,564
April, 1924.....	3,010	1,079	4,089
May, 1924.....	2,786	761	3,547

(a) Excludes screenings and breeze.

Estimated Monthly Consumption of Coal for Manufacture of Coke

(In thousands of net tons)

	Consumed in By-product Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1920 monthly average..	3,684	2,665	6,349
1921 monthly average..	2,401	706	3,107
1922 monthly average..	3,421	1,107	4,528
1923 monthly average..	4,458	2,358	6,816
March, 1924.....	4,627	2,118	6,745
April, 1924.....	4,324	1,702	6,026
May, 1924.....	4,002	1,200	5,202

Burns Bros. Earn \$1,305,311 In Fiscal Year

Net profits of Burns Brothers, of New York City, for the fiscal year ended March 31 last, were \$1,305,311 after depreciation and taxes. After allowing for dividends on the preferred stock the balance was equivalent to \$10.30 a share earned on 80,944 no par shares of class "A" common and \$2.30 a share on 80,940 no par shares of class "B" common. This compared with \$1,140,028, or \$9.18 a share, earned the previous year on the "A" stock and \$1.18 on the "B" common.

The company's consolidated income account for last year compared with that of the previous year as follows:

	1924	1923
Net sales.....	\$30,295,586	\$29,432,807
Cts. and deposit.....	27,739,236	26,799,944
Gross profits.....	\$2,556,350	\$2,632,863
Expenses and taxes.....	1,581,073	1,909,782
Profit.....	\$974,577	\$723,081
Other income.....	330,734	416,947
Net profit.....	\$1,305,311	\$1,140,028
Pr. pref. dividends.....	74,935	90,447
New pref. dividends.....	210,000	210,000
Com. dividends A.....	809,165	809,159
Com. dividends B.....	161,757	161,827
Surplus.....	\$49,454	\$131,405

On March 31 the company had \$2,395,526 cash, \$4,925,318 accounts receivable and coal and supplies on hand valued at \$1,255,952. Accounts payable amounted to \$1,894,975.

At the annual meeting of the board, June 12, Charles Hayden, of Hayden, Stone & Co.; William J. Wason, vice president of the Kings County Trust Co., and Alfred T. Holley, coal and feed dealer of Hackensack, N. J., were elected directors of Burns Brothers to fill two vacancies and that created by the retirement of C. R. Runyon. The other directors were re-elected.

Maps of Superpower Survey Soon Available

The seventeen plates prepared by the Federal Power Commission in connection with the superpower negotiations being conducted by Secretary Hoover are now in the hands of the lithographers. Copies will be available for distribution soon.

The plates being made of maps and curves will be accompanied by a short text, setting forth the findings and conclusions of the engineers who assembled the data. The growth of population and of power consumption in each of the states covered and for the entire eastern section of the northeastern area will be shown. Generating capacity, power loads, hydro-electric possibilities, transmission lines and coal deposits will be shown.

The information set forth in these lithographs will be of particular value to everyone interested in power since it concentrates in graphic form information from several federal agencies and from the states included in this survey.

The fifteen states included in the survey produce half the country's output of power.



A. C. Fieldner

Superintendent of the Pittsburgh station of the U. S. Bureau of Mines, who sailed June 19 for London to attend the world power conference.

Coal Output of Russian Mines Exceeds Program

Gross output of coal by all the coal trusts of Russia during the first six months of the fiscal year 1923-24 (Oct. 1, 1923, to April 1, 1924), according to the *Russian Review*, totaled 362,178,000 poods (a pood is equal to 36.113 lb.), which is 11 per cent in excess of the program and 44.8 per cent more than the output for the corresponding period of the previous year. Of this amount, 69,100,000 poods, or 17 per cent of the output, was used for the needs of the trusts, which is considerably less than the amount used for the same purpose last year.

Shipments from the mines totaled 203,000,000 poods, compared with 187,800,000 poods last year. The increase in shipments, however, is not in proportion to the output, for supplies at the mines were estimated on April 1, 1924, at 1,919,900,000 poods.

Germany Protests Against French Troops in Sarre

Germany has lodged a protest with the League of Nations against the French military occupation of the Sarre coal field, in which France was given exclusive mining rights for fifteen years by the Treaty of Versailles. The Teuton government complains that the continued presence of French troops will exercise an unfortunate moral influence upon the plebiscite which will decide the future of the Sarre territory at the end of the fifteen-year period. Germany requests that the French occupation be brought to an end and that a local gendarmerie be constituted to take the place of the French forces on police duty.

The Council of the League of Nations, in session at Geneva, Switzerland, June 11, postponed action on the note until the August session, but it adopted a resolution expressing satisfaction with the Sarre Governing Commission for increasing the gendarmerie in compliance with the wishes of the council.

Docks Get Little Coal in First Part of Summer

Although movement of coal to the Northwest by the Lakes picked up noticeably after the Interstate Commerce Commission made its recent Northwest rate decision favoring dock shippers, the amount of coal put on the Duluth-Superior docks up to June 1 was only a little over half that of the corresponding period in 1923. Total soft-coal receipts to May 31 were but 996,161 tons this year as compared with 1,832,344 tons last year. Hard-coal receipts were 41,084 tons less than in the same period of 1923 and soft-coal receipts 795,099 tons less, as indicated in the following tables of comparative receipts:

HARD COAL

	Net Tons
April, 1924	84,392
May, 1924	80,240
Total to May 31, 1924	164,632
Total to May 31, 1923	205,716

SOFT COAL

April, 1924	240,018
May, 1924	591,511
Total May 31, 1924	831,529
Total May 31, 1923	1,626,628

TOTAL HARD AND SOFT COAL

April, 1924	324,410
May, 1924	671,751
Total May 31, 1924	996,161
Total May 31, 1923	1,832,344

Austrian Coal Output Gains

Austrian coal production in January, 1924, according to a report from Assistant Trade Commissioner Prentiss M. Terry, Vienna, amounted to 15,662 tons of pit coal and 275,533 tons of lignite, a total of 291,195 tons, as compared with 14,014 tons of pit coal and 239,673 tons of lignite in December, 1923, a gain of 14.8 per cent.

The 291,000 tons of coal produced in January, 1924, exceeded the average monthly production of 1923, which amounted to 234,700 tons, by 56,000 tons or 24 per cent.

Output of Austria in 1923, by provinces, together with the January, 1924, output and the share of each province in the increased production was as follows, in metric tons:

State	Year 1923	Jan., 1924	Increased Output Over 1923 Monthly Average
Styria.....	1,575,047	161,925	30,000
Upper Austria...	355,297	43,167	14,000
Lower Austria...	327,221	32,254	4,000
Burgenland.....	435,577	39,975	4,000
Tyrol.....	36,912	2,710	.....
Carinthia.....	85,037	11,164	4,000
Total.....	2,817,091	291,195	56,000

Imports into Austria during 1923 totaled 3,755,210 tons of pit coal; 865,010 tons of lignite and 403,176 tons of coke.

Total Austrian consumption of mineral fuel in 1923 amounted to 7,814,780 tons as compared with 9,084,945 tons in 1922, a falling off of 1,270,165 tons or 14 per cent. Of the total consumed, 2,791,384 tons, or 36 per cent, was produced by domestic mines and 64 per cent was imported.

Discussion

Did Mine Inspectors Demand Too Little?

**More Inspectors Needed—Every Mine Should Be Treated as Gaseous—
Mechanical Inspectors Should Examine Equipment
Every Thirty Days**

AN ARTICLE in *Coal Age*, May 29, 1924, entitled "Mine Inspectors' Institute Advocates Legislation, etc." contains a list of the demands in the interest of safety.

These demands are good, but the inspectors might have added some more of great importance if their purpose had been to give a complete review of present safety needs in coal mines, as anyone will realize who is familiar with the history of coal mines in America and considers the many fatal mine explosions and mine fires that have occurred, some of them quite recently. If the article as it appeared in *Coal Age* is a complete record of the inspectors' deliberations at the institute it seems that some one must have clapped a muzzle on them. Here are a few regulations that should be considered:

- (1) Prohibit the granting of second-grade certificates for mine foremen.
- (2) All mines should be considered gaseous and be examined prior to the entry of miners.
- (3) The use of electric haulage motors should be prohibited in pillars.
- (4) Exhaust ventilation should be provided in all mines.
- (5) Electric hoists should be prohibited in rooms and pillars.
- (6) No electric

hoists should be permitted in entries except on intake airways and all should be of the explosion-proof type and set at least 100 ft. outby from the last crosscut. The rope should not be allowed to come in contact with any metal or steel that would cause an arc. (7) All pillars should be ventilated by a separate split and no return should be allowed to travel into other live entries or pillars. (8) Where force fans are used drill holes should be put down from the surface to all pillar sections.

(9) Escape and ventilation shafts or slopes should be provided in all mines driven a distance of one mile or more from the nearest entry. (10) All electric apparatus should be of the explosion-proof type and operated and installed only in intake airways. (11) Inspectors should be equally responsible with the mine management for the enforcement of safety in and about all coal mines. (12) At least one full crew of first-aid and mine-rescue men should be provided at every mine. (13) A mechanical inspector should examine all machinery in and about coal mines at least once every three months. (14) Enough mine inspectors should be provided to allow every mine to be examined at least once every sixty days.

Du Bois, Pa.

ALFRED ENGELL.

Two Provinces Seek to Fill Canada's Coal Bins

I have read with interest a reading notice that appeared in the *Montreal Star* on Monday. It quoted from an article by M. D. Geddes as published in *Coal Age*. This article dilated on the coal resources of Canada and the possibility of the United States discontinuing the shipment of anthracite across the international line.

Mr. Geddes referred specially to Alberta and dilated on the tremendous quantity of coal available in that province. However, for some time at least, it will not be practicable to bring that coal to Ontario and Quebec, and Ontario particularly is the point which suffers from its dependence on United States coal. We are inclined to think that the first relief will come from Nova Scotia and that coal will be shipped by water to Montreal and possibly, pending the enlargement of the canals, trans-shipped to smaller vessels and on to Ontario.

Though the coal in Nova Scotia is all bituminous, some of it is of the highest quality. In business the practice is to take the course of least resistance and it seems to me that the

first thing for Canada to do would be to use Nova Scotia coal so far as possible. Some day in the near future large coking plants will be erected at Montreal and Toronto where Nova Scotia coal will be turned into coke and thus a fuel that will supplant anthracite will be available.

W. A. MACKENZIE,
President.

W. A. Mackenzie & Co., Ltd.,
Toronto, Can.

Here Is a Difficult Problem

At the mine we are working, the coal is of splint structure with the following average section: hard slate top, drawslate, 10 in.; fine grade of coal, 48 in.; soft slate, 4½ in.; coal, 4½ in.; mixed slate and coal, 5½ in.; coal, 11 in.; sandstone bottom. The soft slate immediately underlying the 48 in. of coal will not support the weight of an undercutting machine of the shortwall type without the aid of steel skids. It is also so soft that a loader cannot be permitted to use his shovel on the bottom. Can any reader of *Coal Age* suggest a suitable method of operation?

WEST VIRGINIA OPERATOR.

Old Men More Subject Than Younger to Accidents

In the article "Old Men More Subject Than Younger to Accidents" in the issue of June 26, 1924, my meaning and that of T. T. Read has been misinterpreted. In the 28th line, second column, "accidents away from the mines" has been written "accidents in other industries" instead of "non-occupational accidents among miners." Similarly "Other Accidents" should read "Non Occupational Fatalities of Miners" and not "Fatalities of Others." In some other places the same misinterpretation occurs. The figures from the report of the Registrar General, Great Britain, should be used in every case to compare the fatalities of miners at the mines and away from the mines with each other and by wage groups "Frequently" on line 37, col. 1, should read "Frequency" and "about" on line 19, col. 2, should read "above." The figure 8 in the fourth column of the table though out of line with the other figures is correctly quoted.

W. W. ADAMS,
Statistician.

U. S. Bureau of Mines,
Washington, D. C.

Saves One-Third of Powder, Not Two-Thirds

An error for which the editor is not to blame appears in my paper on "Increasing Lump Coal Production by Cushioned Blasting," published in your issue of May 29. On page 805, second column, line 11, the figure given should be two-thirds instead of one-third. The whole sentence which refers to the tests made with rock-dust stemming at an Illinois coal mine should, therefore, read as follows: "The shots made by this method with about two-thirds of the original powder charge brought down the coal satisfactorily with appreciably less screenings than are generally obtained."

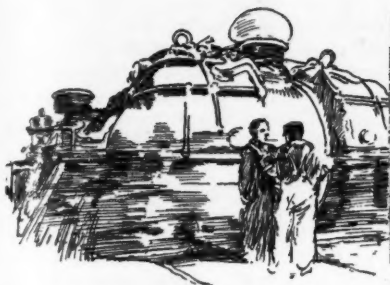
J. H. HORLICK, JR.,
Manager service division,
Hercules Powder Co.
Wilmington, Del.

Queer Mine Names

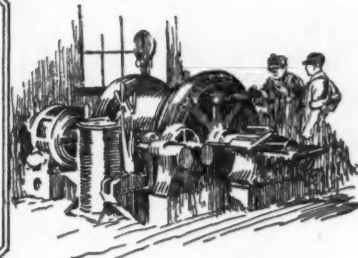
Speaking of queer mine names, I recall those of two little mines that were operated a few years ago when I was district mine inspector, which I believe will compete favorably with the "Struggling Monkey" mine, mentioned in the item that appeared in *Coal Age* Dec. 27, p. 968; or the "Toadvine," or "Who'd 'a' Thought," in the issue of Jan. 24, p. 151, and are entitled to a place in the front ranks of the list of queer mine names.

The first is a little mine operated by the Dayton Coal & Iron Co. on its branch line two miles north of Dayton. It was called the "Tickle Gizzard" mine. Another little mine, located in Scott County and operated by the Paint Rock Coal Co., went under the name of the "Possum Jaw" mine.

JOHN ROSE.
Dayton, Tenn.



Practical Pointers For Electrical And Mechanical Men



How to Use Grinding and Polishing Wheels

The Whole Peripheral Surface of the Wheel
Should Be Used—Ways to True Up the Wheel
—Putting a New Face on the Polisher

BY GUSTAV RADEBAUGH
Urbana, Ill.

EVERY grinding stand should be provided with a safety hood and with a grinding rest that can be adjusted readily. It is important that the grinding rest be adjusted so as to be close to the wheel at all times. In many grinding operations the job is often of such size that it can easily be caught between the rest and the wheel and cause injury to the operator. The grinding rest and hood shown in Fig. 1 gives a good example of a well-protected wheel. When grinding, the top of the wheel should always turn towards the operative, and the work should be moved over its entire face. Often on the inspection of a grinding wheel it will be found that the face is uneven, which makes it difficult to do good work. This is caused by holding the material being ground steadily in one position. One of the most common improper practices is grinding a rod as shown in Fig. 2.

In cutting threads on rods the die will start more easily if the end of the stock is pointed to receive the die. The easiest way to do this is on the grinding wheel. There is no need, however, for wearing the wheel unevenly, if the rod is moved across the face as previously explained. Never hack or gouge a wheel, for in so doing it may be cracked to such an extent that it will break when in service.

When the wheel does not cut as freely as it should and the work heats quickly, the wheel probably needs dressing. This can be done with the grinding-wheel dresser. It is well

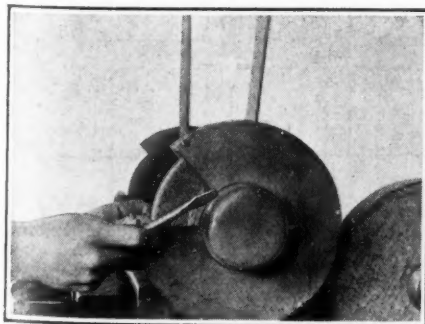


Fig. 1—Adjusting the Rest

If there is much space between the wheel and the rest material will easily get jammed, endanger the operative and probably break the wheel.

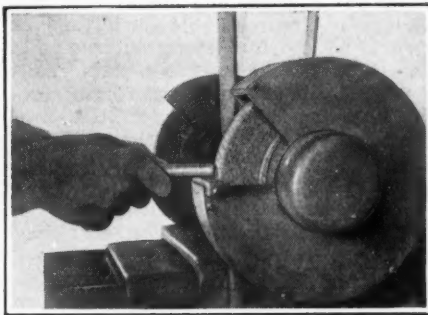


Fig. 2—Tapering a Rod

Unless the whole working surface of the wheel is used uniformly frequent truing will be necessary. Always move the material being ground across the face of the wheel.

to have a dresser always at hand and ready for use, because it is of utmost importance to keep the wheel sharp and perfectly true. One style of dresser is shown in Fig. 3.

I have found that a more accurate job can be done if the dresser is held in such a position as to bring the lugs on the bottom of the dresser against the grinding rest. If the wheel is running out of true, two definite centers having been established, the dresser being held in this manner the high spots will be removed. It is evident that if the dresser is not held immobile the wheel will not be properly dressed, for the dresser then will follow the peripheral shape of the wheel instead of correcting it.

If a commercial dresser is not available a good dresser can be made with a steel handle supporting five or six $\frac{1}{8}$ -in. washers on a bolt. This improvised dresser is not the best for truing a wheel but it will sharpen it satisfactorily. If too much dressing is necessary it is an indication that the wheel is too hard for the work or that it is being run at too high a speed. If the proper grade of wheel is used it should run at a peripheral speed of 4,000 to 6,000 ft. per minute. Referring to the table, the diameter of the wheels and the revolutions per minute of the spindle are listed which give peripheral speeds of 4,000, 5,000 and 6,000 ft. per minute.

When grinding very soft metals, such as lead, aluminum, or brass, the wheel, if not specially made to cut

Table of Grinding-Wheel Speeds

Diameter Wheel Inches	Peripheral Speeds		
	4,000 f.p.m. Expressed in r.p.m.	5,000 f.p.m. Expressed in r.p.m.	6,000 f.p.m. Expressed in r.p.m.
4	3,820	4,775	5,730
6	2,546	3,183	3,820
8	1,910	2,387	2,865
10	1,528	1,910	2,292
12	1,273	1,592	1,910
14	1,091	1,365	1,637
16	955	1,194	1,432

these soft metals, will become "loaded" and will not cut. A wheel is said to be loaded when the pores of the wheels are partly or entirely clogged with the material being ground. This prevents the wheel from cutting and causes excessive heating. If the wheel is loaded the surface will show it plainly. This is caused by the wheel being too hard or the speed too slow or of improper grain and bond. To overcome this, increase the speed or use a softer wheel.

POLISHING AND BUFFING WHEELS

Polishing and buffing wheels made from sheepskin, canvas and wood are only a few of the soft wheels used for polishing and buffing. These wheels are revolved on the grinding stand at a little higher speed than the grinding wheel. The manufacturers of these soft wheels recommend that they be run at a peripheral speed of 7,500 ft. per minute. Every mine repair shop should be supplied with one or more soft wheels.

Such wheels can be resharpened by applying new abrasive material. This is done by applying glue as shown in Fig. 4. After a good heavy coat of glue is placed on the wheel it is rolled in a box, as shown in Fig. 5, which contains abrasive material. It will pay to make up a neat substantial box for this purpose as it is essential that the surface on which the abrasive material is placed be true and close grained.

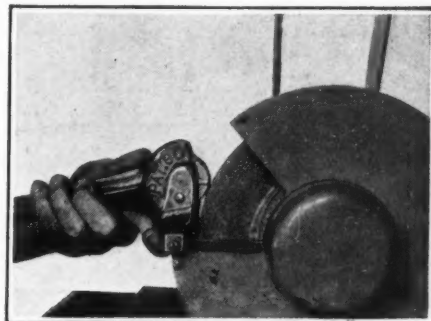


Fig. 3—A Dressing Tool

This device is used to straighten the cutting surface of the wheel. By holding the dresser on the rest the work can be done with greater accuracy.



Fig. 4—Applying Glue to Wheel

When polishing wheels become dull and fail to smooth the surfaces exposed to their rotating action, glue is applied to them to hold new abrasive material.

It is always well when rolling the wheel to apply considerable pressure because this has a tendency to force the grinding crystals well into the glue. After the wheel has been well rolled and the abrasive crystals cover the entire face, it is good practice to roll the wheel over a smooth board applying considerable pressure on the wheel. This will even up the face and

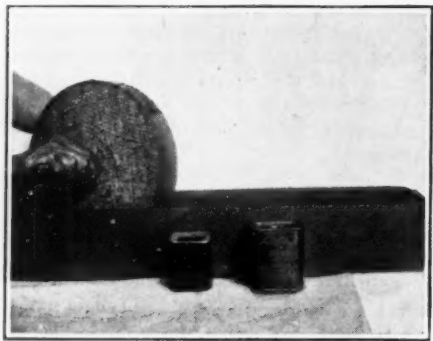


Fig. 5—Roll Wheel in Abrasive

A box is constructed of close grained wood with a smooth bottom. The bottom of this box is dusted with abrasive, and the wheel just glued is rolled in the dust under pressure.

cause the crystals to hold more firmly on the wheel when in use.

The abrasive crystals for soft wheels can be purchased in cans containing from $\frac{1}{2}$ lb. up to 10 and 20 lb. The most common sizes for polishing range from 20 to 80 grain. There are few jobs in general repair work requiring any finer grade than No. 80. Grain sizes of abrasives between 20 and 80 are 24, 30, 36, 40, 46, 54, 60 and 70. The



Fig. 6—Placing Wheel for Drying

It is essential that the abrasive be untouched for several hours, so that the glue may be enabled to harden and hold the abrasive particles. This should be done in a dry, warm room. This illustration shows one way in which this drying can be arranged.

20 grade is the coarse, the 80 the fine. Finer grades such as 90, 100, 120, 150, 180 and 200 are used to prepare work for a high polish.

Once thoroughly rolled the wheel is then laid away to dry before it is used. It should be permitted to season in a warm, dry room for several hours. It is important that the face of the wheel should not come in contact with any object as there is danger of injury to the grinding face. One method of placing the wheel for drying is shown in Fig. 6.

Electric Heaters Dry Out Motors and Conduits

In any mine where water has to be pumped or, for that matter, on the surface also, floods may occur and drown the electrical equipment, perhaps, especially in the case of pump motors, just when the need for the use of that machinery is greatest. At such time an oven is needed for drying out the coils. This oven should be of a certain easily regulated temperature, equal both night and day and in all parts of the oven. It should do its work without attendance and should be free from deleterious fumes of any kind.

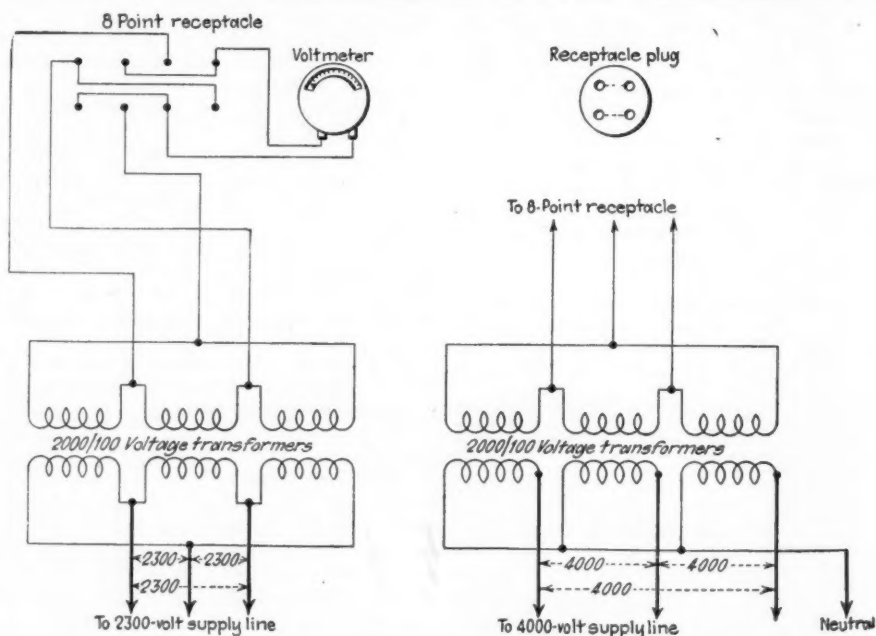
The electric oven or electric heater even without the oven is the most practical and efficacious way of drying wet electric apparatus as was well illustrated when a flood occurred above Cumberland, Md., spreading some 40 or 45 miles west of that city and flooding the streets of Piedmont, W. Va., 3 or 4 ft. deep.

As soon as the flood had subsided ways and means of drying out the water-soaked electrical apparatus were considered and a decision was made in favor of electric heat as the quickest

and most convenient way of driving out the moisture. Accordingly fifty 2 $\frac{1}{2}$ -kw. oven heaters were immediately shipped to the inundated area. When the heaters arrived, a temporary oven was built and fifteen heaters were arranged in three banks of five each and connected to a 550-volt trolley line. The owners brought their electrical equipment to this oven for treatment. The mud and *débris* were washed off with a hose, and the motors were placed in the oven to be dried. Insulation checks were made with a "megger," and when the parts were considered dry they were cleaned and sprayed with insulating varnish and returned to the factories.

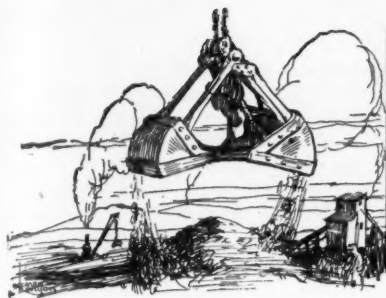
In some instances, it was possible to dry the motors in place, merely by placing the heaters around the equipment and covering them. A great many conduits were dried by placing the heaters underneath the conduits and letting the warm air pass through them. Whenever the heaters could be placed close to the conduit, no wires had to be drawn and the circuits tested out perfectly after drying.

At one plant, over 300 motors, ranging from 1 to 400 hp. were under water. One hundred heaters were sent to the plant and the motors were dried out in place. In less than two weeks, the entire equipment of the plant was again in operation, and less than one per cent of the motors required rewinding or repairing. In this plant, the heaters were simply placed right up against the motors in such a way that an even drying heat could be obtained. It was unnecessary to disconnect the motors or to place them in an oven for drying. A little consideration of the conditions at the mines will enable the reader to adopt for his own use the methods put in operation after the flood just described.

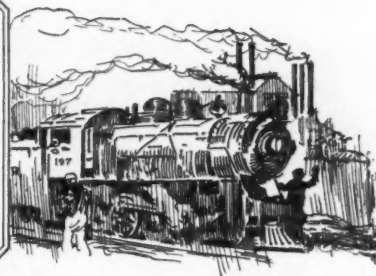


Simple Connection Diagram for Three-Phase Voltmeter Circuit

The best way to prevent delays and breakdowns is to keep a constant check on the performance of equipment. The most essential detail is proper operating voltage. Many three-phase motor circuits are provided with voltmeters, but frequently the meter is connected to but one phase. Sometimes the meter conveys the idea that the voltage is of sufficient value because it is permanently connected to a good phase. Usually the control- or power-distributing circuit is provided with three voltage transformers and it is a simple matter to connect an 8-point receptacle so that the voltage of each phase may be read independently. The diagram shows the connections which may be used for this purpose. The circuit on the left shows delta-connected 2,300-volt transformers. On the right the same type of transformers are connected wye to a 4,000-volt circuit.



Production And the Market



Bituminous-Coal Trade Optimistic While Waiting For Business to "Turn the Corner"

While the bituminous-coal market exhibits no haste in getting "around the corner" from the depression that has held the business in its grip for so long, a fair degree of optimism prevails, born of quiet confidence that awaited developments for the better are about to materialize. Already foreign charters for July at Baltimore are reported at a rate that augurs well for late summer and autumn export business. In most other aspects, however, there is little evidence of actual improvement, additional financial reports by coal-carrying railroads reflecting the adverse effect of the decrease in shipments of soft coal. This is especially marked in the case of the Virginian.

Navy Department Places Contracts

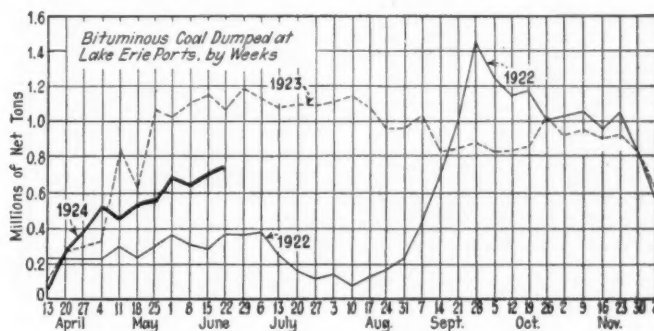
The Navy Department has awarded contracts for 110,100 tons of mine-run bituminous coal for navy yards and naval stations, on the basis of bids opened May 21. Twenty thousand tons will be delivered at New York at \$5.37 per ton under chutes, \$5.37 alongside vessels and \$6.37 delivered in the harbor and unloaded; 30,000 tons will be delivered at Boston at \$5.85 per ton; 20,000 tons at Philadelphia at \$4.90 per ton, and 35,100 tons at Annapolis at \$5.19 per ton.

As in recent weeks, *Coal Age* Index of spot prices of bituminous coal shows no variation, standing at 166 on June 30, the corresponding price being \$2.01. This is the third successive week that it has remained at that level, which would seem to bear out the theory that the bottom has about been reached.

Activity at Hampton Roads has slumped to a marked degree, dumpings of coal for all accounts during the week ended June 28 totaling 287,870 net tons, a falling off of more than 60,000 tons from the week ended June 21, when 350,821 tons was handled. Coal dumped at Lake Erie ports during the week ended June 21, according to the Ore & Coal Exchange, was as follows: Cargo,

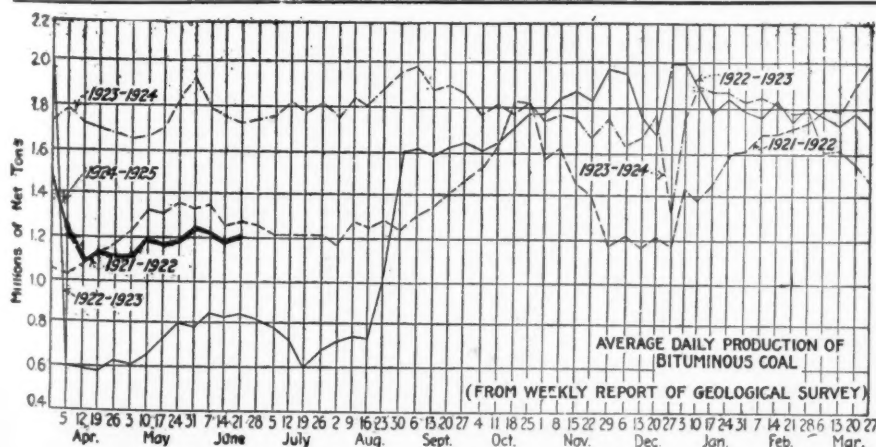
699,519 net tons; fuel 41,168 tons. The figures for the preceding week were 645,978 net tons of cargo coal and 39,184 tons of fuel coal.

Production of bituminous coal advanced slightly during the week ended June 21, but was still below that of the week ended June 7, when the more marked increase was due to a post-holiday spurt. The output for the week ended June 21, according to the Geological Survey, was 7,218,000 net tons, a gain of 66,000 tons over the revised figures for the preceding week, when 7,152,000 tons was produced. Anthracite production



was unchanged, the output for the week ended June 21 being 1,823,000 net tons, the same as for the previous week.

The slowing-down tendency in anthracite business is still in evidence, the market apparently having fallen into the throes of a summer lull that is likely to last until late-summer or early-autumn ordering sets in. Although July price advances were looked for, independent quotations show a weakening, due to the scarcity of orders. Stove continues to lead in demand, with no close competitor among the other sizes. Pea is lagging to such an extent that it is being stored. The demand for the buckwheats is fading fast.



No Midwest Pick-Up Yet

Not a bit of improvement in the markets of the Midwest region was noted during the week. The domestic market for lump is simply non-existent. Practically all lump coal is being crushed. A very little 6 x 3-in. egg is produced for the benefit of the few dealers who are beginning to stock a little, having concluded that the price will never be lower, but day-to-day steam business is all that is worth talking about. Screenings and the smaller nut sizes are moving, although sluggishly. A little good southern Illinois screenings going to the country still brings as high as \$1.90, but that which goes into Chicago sells for \$1.75@ \$1.85. Central Illinois screenings are a little firmer at \$1.60@ \$1.75.

Western Kentucky coal continues to disturb the Midwest market for all other coals. Mine run at \$1.40@ \$1.60 and screenings for a short time ranging from \$1.25 upward set price paces that cannot be met. St. Bernard coal from mines that are trying to open on a 1917 wage basis has not yet appeared on the market. A July price of \$2 on smokeless mine run has been announced in Chicago. The market for this coal is very draggy just now. There are practically no new contracts on any kind of fuel.

A survey of the retail situation at St. Louis develops

the fact that domestic coal has not been put in this spring by the more prosperous homes for one principal reason: wet weather. People who have soft drives and whose coal is hauled across the lawn will not consider putting it in until the ground hardens up, and in this territory there has been rain every day for over two months. Practically no storage coal is being handled and coke also has dropped off. Wagonload steam is almost at a standstill and country domestic is absolutely dead. Local carload steam is quiet, although the big plants are buying a little and country steam is not a factor.

There has been no change in St. Louis prices. In anticipation of better business the next two months something like 2,000 tons of smokeless West Virginia has been ordered for July and August shipment. These orders were placed last week. Dealers report heavy supplies of all higher priced coals on hand in anticipation of some demand in July.

Kentucky Feels Better

Business is showing just a little improvement with the Kentucky operators, and the outlook is better than it has been for some time past in spite of dullness in the iron, steel and the auto industry and a slowing down of small industries in various lines. The eastern Kentucky field, aided by low wage scales as compared with the union fields, has

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	July 2 1923	June 16 1924	June 23 1924	June 30 1924†
Smokeless lump	Columbus		\$5.85	\$3.65	\$3.85	\$3.75@ \$4.00
Smokeless mine run	Columbus		3.60	2.30	2.20	2.10@ 2.35
Smokeless screenings	Columbus		3.35	1.25	1.30	1.10@ 1.50
Smokeless lump	Chicago		6.10	3.60	3.60	3.50@ 3.75
Smokeless mine run	Chicago		3.75	2.00	2.00	2.00
Smokeless lump	Cincinnati		6.25	3.75	3.85	3.75@ 4.00
Smokeless mine run	Cincinnati		3.35	1.85	1.85	1.60@ 2.05
Smokeless screenings	Cincinnati		3.00	1.50	1.50	1.00@ 1.25
*Smokeless mine run	Boston		5.60	4.30	4.30	4.25@ 4.40
Clearfield mine run	Boston		2.35	2.00	2.00	1.65@ 2.25
Cambria mine run	Boston		2.85	2.45	2.45	2.25@ 2.75
Somerseset mine run	Boston		2.60	2.15	2.15	1.85@ 2.50
Pool 1 (Navy Standard)	New York		3.60	2.70	2.70	2.50@ 2.90
Pool 1 (Navy Standard)	Philadelphia		3.60	3.00	3.00	2.75@ 3.25
Pool 1 (Navy Standard)	Baltimore					
Pool 9 (Super. Low Vol.)	New York		2.80	2.20	2.20	2.00@ 2.40
Pool 9 (Super. Low Vol.)	Philadelphia		2.80	2.20	2.20	2.00@ 2.45
Pool 9 (Super. Low Vol.)	Baltimore		2.60	1.85	1.85	1.80@ 1.90
Pool 10 (H.Gr. Low Vol.)	New York		2.45	1.85	1.85	1.75@ 2.00
Pool 10 (H.Gr. Low Vol.)	Philadelphia		2.20	1.85	1.85	1.70@ 2.00
Pool 10 (H.Gr. Low Vol.)	Baltimore		2.25	1.65	1.65	1.60@ 1.70
Pool 11 (Low Vol.)	New York		2.05	1.60	1.60	1.50@ 1.75
Pool 11 (Low Vol.)	Philadelphia		1.85	1.50	1.50	1.30@ 1.70
Pool 11 (Low Vol.)	Baltimore		2.05	1.55	1.55	1.50@ 1.60

High-Volatile, Eastern		Market Quoted	July 2 1923	June 16 1924	June 23 1924	June 30 1924†
Pool 54-64 (Gas and St.)	New York		1.80	1.50	1.50	1.35@ 1.65
Pool 54-64 (Gas and St.)	Philadelphia		1.60	1.55	1.55	1.45@ 1.70
Pool 54-64 (Gas and St.)	Baltimore		1.75	1.50	1.50	1.40@ 1.60
Pittsburgh sc'd gas	Pittsburgh		2.80	2.40	2.40	2.30@ 2.50
Pittsburgh gas mine run	Pittsburgh			2.10	2.10	2.00@ 2.25
Pittsburgh mine run (St.)	Pittsburgh		2.05	1.85	1.85	1.75@ 2.00
Pittsburgh slack (Gas)	Pittsburgh		1.50	1.35	1.20	1.20@ 1.25
Kanawha lump	Columbus		3.00			
Kanawha mine run	Columbus		1.85			
Kanawha screenings	Columbus		1.25			
W. Va. lump	Cincinnati		3.50	2.25	2.25	2.00@ 2.50
W. Va. gas mine run	Cincinnati		1.85	1.35	1.35	1.25@ 1.60
W. Va. steam mine run	Cincinnati		1.85	1.35	1.35	1.25@ 1.60
W. Va. screenings	Cincinnati		1.25	.85	.90	.75@ 1.00
Hocking lump	Columbus		2.75	2.45	2.45	2.25@ 2.65
Hocking mine run	Columbus		1.85	1.70	1.70	1.60@ 1.85
Hocking screenings	Columbus		1.25	1.35	1.35	1.30@ 1.45
Pitta. No. 8 lump	Cleveland		2.55	2.40	2.35	2.00@ 2.75
Pitta. No. 8 mine run	Cleveland		1.95	1.85	1.85	1.80@ 1.90
Pitta. No. 8 screenings	Cleveland		1.25	1.15	1.10	1.05@ 1.15

Midwest		Market Quoted	July 2 1923	June 16 1924	June 23 1924	June 30 1924†
Franklin, Ill. lump	Chicago		\$3.90	\$2.75	\$2.75	\$2.50@ \$3.00
Franklin, Ill. mine run	Chicago		3.00	2.35	2.35	2.25@ 2.50
Franklin, Ill. screenings	Chicago		1.65	1.90	1.80	1.75@ 1.90
Central, Ill. lump	Chicago		2.60	2.35	2.35	2.25@ 2.50
Central, Ill. mine run	Chicago		2.10	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago		1.35	1.60	1.55	1.60@ 1.75
Ind. 4th Vein lump	Chicago		3.35	2.75	2.85	2.75@ 3.00
Ind. 4th Vein mine run	Chicago		2.60	2.35	2.35	2.25@ 2.50
Ind. 4th Vein screenings	Chicago		1.60	1.80	1.80	1.75@ 1.90
Ind. 5th Vein lump	Chicago		2.85	2.35	2.35	2.25@ 2.50
Ind. 5th Vein screenings	Chicago		2.10	2.10	2.10	2.00@ 2.25
Mt. Olive lump	St. Louis		1.45	1.60	1.60	1.50@ 1.75
Mt. Olive mine run	St. Louis		2.85	2.85	2.85	2.75@ 3.00
Mt. Olive screenings	St. Louis		2.50	2.50	2.50	2.50
Standard lump	St. Louis		2.25	2.15	2.15	2.00@ 2.35
Standard mine run	St. Louis		1.75	1.80	1.80	1.75@ 1.85
Standard screenings	St. Louis		1.20	1.50	1.45	1.40@ 1.50
West Ky. lump	Louisville		2.25	2.05	2.00	1.90@ 2.15
West Ky. mine run	Louisville		1.75	1.50	1.55	1.50@ 1.75
West Ky. screenings	Louisville		1.15	1.50	1.55	1.15@ 1.35
West Ky. lump	Chicago		2.40	2.00	1.85	1.75@ 2.00
West Ky. mine run	Chicago		1.15	1.50	1.60	1.50@ 1.75

South and Southwest		Market Quoted	July 2 1923	June 16 1924	June 23 1924	June 30 1924†
Big Seam lump	Birmingham		3.05	3.00	3.00	3.10@ 3.30
Big Seam mine run	Birmingham		2.05	1.85	1.90	1.95@ 2.30
Big Seam (washed)	Birmingham		2.35	2.00	2.00	1.95@ 2.45
S. E. Ky. lump	Chicago		3.25	2.10	2.10	2.00@ 2.25
S. E. Ky. mine run	Chicago		2.35	1.50	1.60	1.25@ 2.20
S. E. Ky. lump	Louisville		3.25	2.10	2.10	2.00@ 2.25
S. E. Ky. mine run	Louisville		2.00	1.55	1.50	1.35@ 1.75
S. E. Ky. screenings	Louisville		1.25	1.05	.95	.80@ 1.10
S. E. Ky. lump	Cincinnati		3.10	2.25	2.50	2.25@ 2.75
S. E. Ky. mine run	Cincinnati		1.75	1.50	1.45	1.25@ 1.65
S. E. Ky. screenings	Cincinnati		1.00	.85	.90	.75@ 1.10
Kansas lump	Kansas City		4.00	4.50	4.50	4.50
Kansas mine run	Kansas City		3.25	3.50	3.50	3.50
Kansas screenings	Kansas City		2.60	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

‡ On strike.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	July 2, 1923		June 23, 1924		June 30, 1924	
			Independent	Company	Independent	Company	Independent	Company
Broken	New York	\$2.34		\$7.75@ \$8.35		\$8.00@ \$8.85		\$8.00@ \$8.85
Broken	Philadelphia	2.39		7.00@ 8.10		8.70@ 8.85		8.70@ 8.85
Egg	New York	2.34	\$8.50@ \$11.50	8.00@ 8.35	\$8.75@ \$9.25	8.45@ 8.85	\$8.75@ \$9.00	8.45@ 8.85
Egg	Philadelphia	2.39	9.25@ 10.50	8.10@ 8.35	8.80@ 9.60	8.80@ 8.85	8.80@ 9.60	8.80@ 8.85
Egg	Chicago	5.06	7.60@ 10.25	7.25@ 7.45	7.86@ 8.00	7.83@ 7.90	7.86@ 8.00	7.83@ 7.90
Stove	New York	2.34	8.50@ 11.50	8.00@ 8.35	9.00@ 9.25	8.45@ 9.10	9.00@ 9.25	8.45@ 9.10
Stove	Philadelphia	2.39	9.25@ 10.00	8.15@ 8.35	9.15@ 9.80	8.85@ 9.00	9.15@ 9.80	8.85@ 9.00
Stove	Chicago	5.06	7.60@ 10.25	7.25@ 7.45	8.17@ 8.30	8.13@ 8.23	8.17@ 8.30	8.13@ 8.23
Chestnut	New York	2.34	8.50@ 11.00	8.00@ 8.35	8.75@ 9.25	8.45@ 8.95	8.75@ 9.00	8.45@ 8.95
Chestnut	Philadelphia	2.39	9.25@ 10.50	8.15@ 8.35	8.85@ 9.70	8.85@ 8.85	8.85@ 9.70	8.80@ 8.85
Chestnut	Chicago	5.06	7.60@ 10.25	7.25@ 7.45	8.00@ 8.13	8.08@ 8.13	8.00@ 8.13	8.08@ 8.13
Range	New York	2.34		8.30		8.70		8.70
Pea	New York	2.22	7.25@ 8.00	6.00@ 6.30	5.00@ 5.50	5.50@ 6.00	4.50@ 5.50	5.50@ 6.00
Pea	Philadelphia	2.14	7.00@ 7.35	6.15@ 6.20	5.75@ 6.25	5.75@ 6.00	5.75@ 6.25	5.75@ 6.00
Pea	Chicago	4.79	6.25@ 7.25	5.50@ 5.65	5.13@ 5.45	5.36@ 5.91	5.13@ 5.45	5.36@ 5.91
Buckwheat No. 1	New York	2.22	2.75@ 3.50	3.50@ 4.15	2.15@ 2.75	3.00@ 3.15	2.00@ 2.75	3.00@ 3.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.50		2.50@ 3.00	3.00	2.50@ 3.00	3.00
Rice	New York	2.22	2.00@ 2.50		1.75@ 2.15	2.25	1.50@ 2.15	2.25
Rice	Philadelphia	2.14	1.75@ 2.50		2.00@ 2.25	2.25	2.00@ 2.25	2.25
Barley	New York	2.22	1.25@ 1.50		1.15@ 1.50	1.50	1.00@ 1.60	1.50
Barley	Philadelphia	2.14	1.15@ 1.50		1.50	1.50	1.50	1.50
Birdseye	New York	2.22		1.60		1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924			1923
	June 30	June 23	June 16	July 2
Index	166	166	166	203
Weighted average price	\$2.01	\$2.01	\$2.01	\$2.46

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

been able to operate 50 per cent or better. In western Kentucky the strip mines are reported to be operating six days a week in some instances, and to be loading out a lot of coal. Indications also are for larger production in that field as a result of a couple of companies having been able to resume operations on a reduction of 20 per cent in wage scales.

Retailers are meeting with a slightly better stocking demand from domestic consumers, resulting in somewhat better call for mine run and prepared sizes, while screenings, although in better supply, have been moving a shade more briskly as a result of some large consumers exhausting their storage stocks. School and institution contracting is improving. Lake movement has been slow in developing, but is coming better. Utilities and big industrial consumers have adopted a waiting policy in spite of low prices. Prices continue steady except that screenings are slightly weaker, due to larger production.

Northwest Markets Lifeless

The Milwaukee market is lifeless, with little prospect of betterment during the summer months. Bituminous coal, especially the inferior grades, is weak and somewhat unstable in price. On the other hand, Pocahontas egg and nut have been advanced 50c. per ton. The price is now \$9.25 wholesale and \$10.75 retail. Cargo receipts since the opening of navigation aggregate 242,598 tons of anthracite and 523,420 tons of soft coal. Anthracite is short 25 per cent and bituminous about 50 per cent compared with this time last year.

Competing desperately for business and getting but little result is the present story of the coal trade in the Minne-

apolis and St. Paul territory. All concerned are mixing in a free-for-all in which no holds are barred and no rules apply. For instance, a contract for 1,200 tons of Youghiogheny lump was bid for a North Dakota town at \$4.90, a cut of \$1.10 from the list price. But even price slashing gets little business. The anticipated trade resulting from July 1 exhausting of stocks is not developing. Several of the railroads are feeling around on the subject of contracts for the coming year, but as they are covered for 60 to 90 days, they are not eager.

The dock companies are receiving fair tonnages for their Lake Superior docks, but seem not inclined to load them as heavily as a year ago, even with the promise of better related freight rates with which to meet all-rail competition. Prices on all-rail coal continues to be low. Franklin County (Illinois) lump continues to be around \$2.50, with little response to this figure.

Parts of West Do Business

There has been no change in conditions in the Southwestern district as compared with those of a week ago. A little storage of Arkansas semi-anthracite by home owners is reflected in increased orders from retailers, there has been a slight increase in the demand for Kansas coal for threshing as the harvest starts, and the industrial demand for screenings continues sufficiently strong to prevent accumulation of "no bills." Prices are: Kansas lump, \$4.50; nut, \$4; mine run, \$3.50, and screenings, \$2.50. Arkansas semi-anthracite lump, \$5.50@6; mine run, \$3.25@3.50, screenings, \$2. Henryetta (Okla.) lump, \$5.50; nut, \$3.75; mine run, \$3.50; screenings, \$2.50.

The coal market in Colorado dragged along during the past week without much change. Dealers still remain indifferent as to summer orders, despite the fact that another advance in price was scheduled for July 1. Colorado mines averaged 21 hours last week. Forty-six per cent of working time lost was attributed to no market.

Utah mines are increasing production slightly. The working time is now fully two days a week. There are fewer "no bills," but there are still too many for the good of the industry and the railroads. Operators report lump coal to be a drug on the market, but in some cases they are finding it hard to supply the trade with smaller sizes. The slack situation is satisfactory. In spite of the efforts of organized retailers, very little coal is being stored yet.

Further gains have been recorded in the production of mines in southern West Virginia, the output of mines in the northern part of the state remaining about the same. Although some smokeless contracts have been made recently, many sales are on a spot basis and the spot market is far from brisk. So far as high volatile is concerned there has been little change in price or demand.

Domestic Trade Stronger in Ohio

Smokeless domestic coals are stronger in the Cincinnati market because of a further limitation of production. Low-volatile operations are closing down because of the apparently hopeless situation as to slack, which had dropped to \$1 and \$1.25 this week in the best byproduct production, without any visible stimulation of demand. High-volatile coals are all off, nut and slack being weaker. Steam demand has fallen off in part at least because industrial operations have been reduced by shortage of orders. Domestic demand is better and further improvement is expected to follow the customary beginning of household buying for next winter's use in July. The state government will call for bids within a few days on 150,000 tons of coal for state institutions.

The small increase in demand for domestic sizes at Columbus continues, but steam trade is rather dull and featureless. Utilities and railroads are the best purchasers of steam grades while school coal also is moving freely. There is not as much distress coal on the market and prices are steadier. Contracting is slow as most of the consumers are buying from the open market.

Smokeless, which was fairly active several weeks ago, has relapsed into quietude. Splints and Kentucky grades are the best features of the domestic demand. Retail prices are fairly steady at the levels which have maintained for some time. Little demand has developed for Ohio-mined varieties. Lake trade is not cutting much figure as far as the southern Ohio field is concerned, but in eastern Ohio there is a considerable lake movement, which is holding up the output.

Stagnation prevails in the Cleveland market. Some of the larger operators feel that the turning point is not far distant, however, and are taking hope. Stocks can last but a short while longer. According to a monthly survey of coal consumption made by the Fuel Committee of the National Association of Purchasing Agents, coal consumption during May of this year was nearly 25 per cent less than in May, 1923.

The Pittsburgh market shows no discernible change for the week. Slack seems to be a trifle easier but can hardly be quoted any lower. There are no signs of the district being able to work in the lake trade to any extent, while the steel industry has slowed down farther and some mills will close next week for a week or more, so that demand is likely to be lighter before it is heavier.

Production in central Pennsylvania remains stationary. The scramble for orders makes it possible for some mines to do business, but others, unable to get orders, must close.

Trade at Buffalo is about as dull as it ever is at this time of the year. Some of this inactivity is due to the slowing down of business during the past few weeks, a state of things that it expected to continue until there is less politics in the air. This means till fall, no doubt.

New England Market Drags

In New England the market drags along with little relief from the dullness that has prevailed for so long. The price of \$1.50 per net ton at the mines for slack, recently made the Panama R.R. by one of the smokeless agencies, is a fair indication of the state of trade, and while there are some who persist in being hopeful and are sure that before many weeks now the corner will have been turned, the general opinion is none too favorable. While accumulations at Hampton Roads are not as large as at times there is a plenty on hand for spot dumping. The range of price is precisely the same as a week ago, namely: \$4.25@\$4.40 per gross ton f.o.b. vessel.

For distribution inland there is a similar lack of interest on the part of buyers. The nominal quotation at Boston still is \$5.75 per gross ton on cars, but sales are still reported at \$5.50@\$5.60. At Portland the range is perhaps 15c. higher, but inquiry is fugitive.

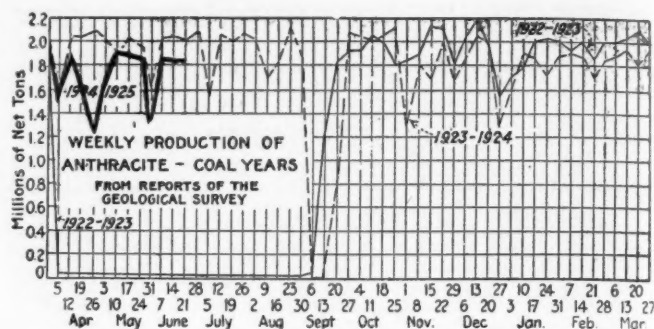
All-rail from central Pennsylvania the state of things is most discouraging. A slight indication of better prospects a week ago has given way to a rather hopeless attitude so far as concerns July business. Even small consumers who buy but a few cars each summer are postponing their purchases, being led to think the current market holds no inducement.

Trade at the New York and Philadelphia piers is extremely dull. Movement for coastwise delivery is very light and prices are depressed.

Buying Limited in Seaboard Markets

Buying is scarce at New York, although the daily average of cars reported at the tidewater terminals remains around 1,500. Tidewater quotations have, however, not been affected to any extent although occasional purchases are reported at less than the printed quotations. Line demand is slow and easy. Things look brighter to those salesmen who travel New England territory and more inquiries are reported from buyers. In the New York market the tendency of consumers with reserve stocks to reduce them before placing new orders continues. Few if any contracts are reported as being made.

The Philadelphia market is soggy, buying being on a limited scale. Efforts to induce the iron trade to take in



excess coal, as it usually does at this time, are unavailing. Central station power plants are buying liberally. The railroads still have goodly reserves on hand. Spot prices are unchanged and tide conditions have not improved.

Industrial demand at Baltimore continues light and while there is a feeling in the air that a change for the better is about due and that business generally has been dragging bottom and will now come up on a flood tide, there is no actual indication of this as yet. The coal roads continue to report light haulage and mine representatives and jobbers say that selling has to be forced at all times. The fact that exports have shown up a bit better for the middle part of June, and that a number of charters are reported ahead for July, has heartened that end of the business.

General depression rules in the Birmingham markets, with scarcely an inquiry. Consumers are apathetic, as all branches of industry are slowing down and fuel requirements are essentially being decreased in a comparative degree. Domestic grades will be up about 20c. per ton in July over the June schedules. Several commercial mines holding old contracts with the Seaboard Air Line which were not renewed for the coming year, are closing down.

Anthracite Market Continues to Slip

Demand for anthracite continues to slacken and quotations for independent product are a trifle lower, unless straight lots of stove coal are desired. On July 1 the larger producers, including independent operators, were expected to issue new prices showing advances from those announced on June 1 for domestic sizes, although there was some talk that the independent operators might not make any advances because of the present lack of demand. No heavy buying of domestic coals is expected until the vacation season is about ended. As during the past several weeks, stove coal is leading the demand and most dealers find it necessary to take either egg or chestnut in order to get the former. Pea coal continues to lag and storing is being resorted to. The demand for the buckwheats is rapidly disappearing.

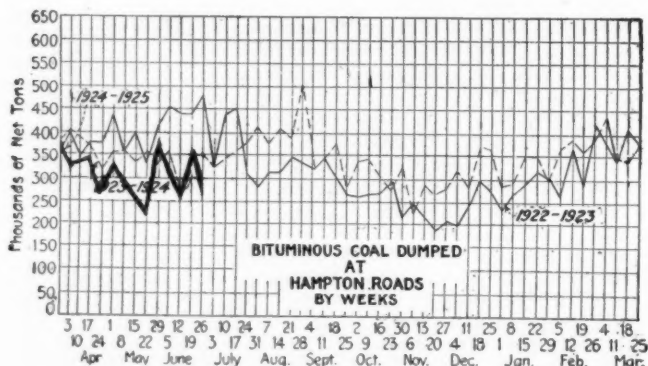
Summer weather has put almost an entire stop to the retail trade in Philadelphia. The yards are well stocked with all sizes except stove, and even this size is coming along more freely now than at any time since spring. Stocks of chestnut coal are larger now than for years, and most of the dealers have no room for any more of it. Pea also is catching up. Egg is freer than stove. Steam sizes are very slow and even cut prices by the small producer is moving only a limited tonnage.

There is still uncertainty as to prices in the Baltimore market. There are some in the retail trade who would like to prevent a raise, if possible, but others feel that the retail trade has already gone too far in absorbing the wholesale advances that have taken place since May 1. Should there be wholesale advances for July it seems almost sure that a minimum raise of 25c. per ton must take place in retail prices.

Car Loadings, Surpluses and Shortages

	Cars Loaded	
	All Cars	Coal Car
Week ended June 14, 1924	902,710	138,252
Previous week	910,707	143,353
Week ended June 14, 1923	1,008,838	186,955

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
June 14, 1924	362,961	169,133		
Previous week	356,723	172,311		
June 14, 1923	51,988	3,129	12,787	9,257



Foreign Market And Export News

British Market Still Gaining Gradually; Output Hard Hit by Holidays

The Welsh coal market is improving, activity showing a gradual but steady gain. The strike of railway shopmen, now settled, has helped somewhat, though power-house operators stayed in. Business with Europe is very poor, particularly with France and Italy. Several big orders have been placed by South America for Monmouthshire large coals at prices averaging 26s. 6d. The Welsh coal field as a whole has been hampered by continual threats of sectional strikes, but tonnage is arriving much more freely. Lower qualities are reported plentiful and prices easier, while the better grades of coal are steadier. Demand is picking up but is still below output. The employment of non-union workers is threatening labor trouble.

The Ruhr settlement has resulted in the withdrawal of many German inquiries from Newcastle. The Paris gas works has contracted for 70,000 tons of ordinary Durham gas coal for shipment from July to December at 20s. f.o.b. Large contracts from the Swedish State Rys. have been allocated.

A cable to *Coal Age* states that the output of the British collieries during the week ended June 14 dropped to 3,236,000 tons owing to the observance of the Whitsuntide holidays, according to the official figures. This compares with 5,120,000 tons produced in the week ended June 7.

Trade at Hampton Roads Poor; Market Weakening

Business at Hampton Roads is poor, with the market weakening and movement generally falling off. Indications were June would show the lowest dumping record for the year.

Coastwise trade is less than fair, while bunker business is off and foreign movement showing little change.

The tone of the market is extremely dull, with stocks at tidewater substan-

tially increased and with shippers eager to move their stocks under any conditions to obviate demurrage.

New Business Is Scarce In French Market

The French coal market is unchanged. The French collieries are making regular shipments on existing contracts, but are not obtaining any new business, except perhaps for the renewal of expiring contracts. Since the settlement of the Ruhr strike deliveries are nearing their normal scale again. Recently a large number of German inquiries for coal appeared on the free market, but with the political upheaval in France, these inquiries have disappeared.

House coal trade shows the effect of the increase of British anthracites. All the coal syndicates advise their adherents to defer ordering and dealers also suggest these measures.

Indemnity deliveries to France and Luxemburg during May consisted of 243,400 tons of coal; 365,300 tons of coke and 33,900 tons of lignite briquets, a total of 342,600 tons, against 1,301,100 tons in April.

With regard to the renewal or prolongation of the Ruhr agreements, the M.I.C.U.M. heard the usual declarations of the industrialists on their inability to continue the deliveries. After receiving advices from Berlin, the mines and cokeries have accepted a prolongation of two weeks.

It is understood that the next arrangement, which is to be in operation in July, may have a retroactive effect as from June 16 as regards the abolition of the "kohlensteuer" (coal tax) on export permits and derogations and other allowances in species.

During the first ten days of June, the O.R.C.A. was supplied with 103,330 tons of coke, or a daily average of 10,333 tons.

United States Domestic Coal Exports During May

	(In Gross Tons)	1923	1924
Anthracite.....		445,813	274,932
Value.....		\$4,659,269	\$3,060,423
Bituminous.....		2,249,001	1,231,740
Value.....		\$12,648,775	\$5,702,818
Coke.....		165,643	40,295
Value.....		\$1,816,332	\$328,619

Export Clearances, Week Ended June 28, 1924

FROM BALTIMORE	
For Canada:	Tons
Ital. Str. Valbormide.....	5,056
FROM HAMPTON ROADS	
For Brazil:	
Br. Str. Asuncion De Larrinaga for Rio de Janeiro.....	5,725
Br. Str. Avonmeade for Rio de Janeiro.....	5,960
Br. Str. Davenby Hall for Rio de Janeiro.....	5,678
Br. Str. Sedgpool for Rio de Janeiro.....	7,660
For Cuba:	
Br. Str. Onaway for Havana.....	5,530
For China:	
Br. Str. Romeo for Hong Kong.....	2,404
For France:	
Ital. Str. Emanuele Accame for Marseilles.....	11,353
Fr. Str. P. L. M. 25 for Marseilles.....	8,048
For Italy:	
Ital. Str. Mazzani for Porto Ferrajo.....	8,046
For Newfoundland:	
Br. Str. Hardanger for Humbermouth.....	3,461
For Nova Scotia:	
Amer. Schr. James M. W. Hall for Halifax.....	833
For Porto Rico:	
Nor. Str. Marita for Manatl.....	2,192
For United States:	
Amer. Str. Hanley for San Francisco.....	3,023
For West Indies:	
Nor. Str. Thomas Haaland for Curaçao.....	4,413
For (?)	
Br. Str. Baron Glenconner for Quessant.....	4,964
FROM PHILADELPHIA	
For Cuba:	
Nor. Str. Sydfold for Havana.....	—

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	June 21	June 28
Cars on hand.....	327	1,205
Tons on hand.....	22,096	76,843
Tons dumped for week.....	99,561	102,165
Tonnage waiting.....	10,000	15,000
Virginian Piers, Sewalls Pt.:		
Cars on hand.....	776	1,355
Tons on hand.....	59,400	98,200
Tons dumped for week.....	100,531	86,998
Tonnage waiting.....	12,746	2,851
C. & O. Piers, Newport News:		
Cars on hand.....	1,521	1,892
Tons on hand.....	76,735	94,665
Tons dumped for week.....	113,141	67,863
Tonnage waiting.....	7,710	2,305

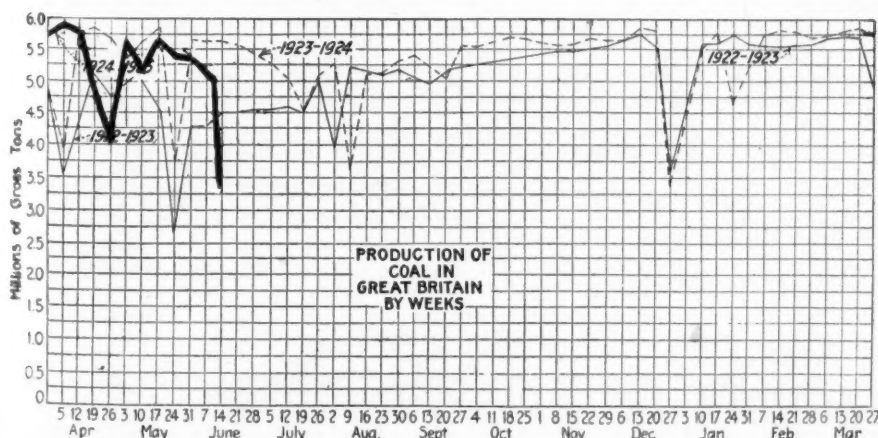
Pier and Bunker Prices, Gross Tons

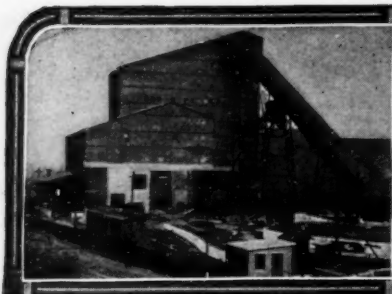
PIERS	June 21	June 28†
Pool 9, New York....	\$4.85@5.00	\$4.60@4.80
Pool 10, New York....	4.50@4.75	4.50@4.75
Pool 11, New York....	4.40@4.50	4.55@4.60
Pool 9, Philadelphia..	4.70@5.05	4.70@5.05
Pool 10, Philadelphia..	4.45@4.80	4.45@4.80
Pool 11, Philadelphia..	4.30@4.55	4.30@4.55
Pool 1, Hamp. Roads	4.35	4.35@4.40
Pool 2, Hamp. Roads	4.25	4.15@4.20
Pools 5-6-7, Hamp. Rds.	4.10@4.15	4.00@4.10
BUNKERS		
Pool 9, New York....	5.15@5.30	4.90@5.30
Pool 10, New York....	4.80@5.05	4.80@5.05
Pool 11, New York....	4.70@4.80	4.65@4.80
Pool 9, Philadelphia..	5.00@5.40	5.00@5.40
Pool 10, Philadelphia..	4.75@5.00	4.75@5.00
Pool 11, Philadelphia..	4.50@4.80	4.50@4.80
Pool 1, Hamp. Roads	4.45	4.40
Pool 2, Hamp. Roads	4.35	4.20
Pools 5-6-7, Hamp. Rds.	4.20	4.10

Current Quotations British Coal f.o.b. Port, Gross Tons

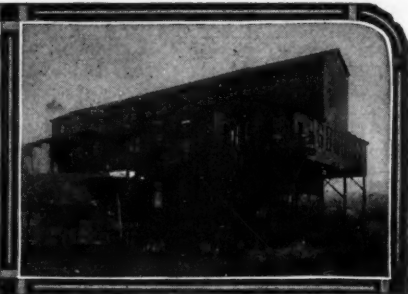
Quotations by Cable to Coal Age	June 21	June 28†
Admiralty, large..	27s. 6d. @ 28s.	28s. 3d. @ 28s. 6d.
Steam smalls.....	18s. 6d.	18s. 6d. @ 19s.
Newcastle:		
Best steams.....	21s. @ 22s.	20s. @ 21s.
Best gas.....	23s. @ 23s. 6d.	23s. @ 23s. 6d.
Best bunkers.....	20s. @ 21s. 6d.	20s. @ 21s. 6d.

† Advances over previous week shown in heavy type, declines in italics.





News Items From Field and Trade



COLORADO

Oil prospecting on a tract of Routt County land belonging to the Colorado Fuel & Iron Co., is now going on. J. F. Welborn, president of the company, has announced that oil men repeatedly have declared there was oil under some of the company's coal lands, so finally a lease was made on a small tract on Snake River on the line between Routt County and Carbon County, Wyoming, to the Ohio Oil Co., a subsidiary of the Standard Oil Co. Thus, says Mr. Welborn, it will be determined by a reliable oil company whether there is any oil on Colorado Fuel & Iron Co. property without cost to the company.

INDIANA

E. D. Logsdon of Indianapolis, coal operator and head of the Knox Consolidated Coal Co., the marketing agency for the mines controlled by Mr. Logsdon, has been named by Governor Emmett S. Branch as a member of the state agricultural board. Mr. Logsdon always has taken an active interest in agricultural affairs and is known as a raiser of pure bred cattle.

William J. Snyder, well known coal man of Brazil, who has become a confirmed globe trotter since the coal business slumped, has returned home after having spent the last seven months on tour of the world. He was accompanied by his grandson, Billy Hall, of Indianapolis. During the last tour the two visited New Zealand, Australia and other islands of the South Seas, then voyaging around the southern coast of Asia, through the East Indies to China, Japan and the Philippines and back home by way of Honolulu. While in China, he stopped off for a visit at Shanghai, where his wife, Grace Snyder, was killed by Korean revolutionists March 28, 1922.

The Kentucky Coal Co. was awarded the contract for coal for Delaware County, Ind., at a recent meeting of the Board of County Commissioners at Muncie, Ind. Pocahontas coal is to cost \$4.75 laid down in Muncie and West Virginia will cost \$4.62 f.o.b., Muncie.

KANSAS

The Italian Coal Co., a co-operative organization of 24 miners, has been given a verdict against the Patton Coal & Mining Co. for \$8,050 by a jury in the Crawford County District Court at Pittsburg. The Italian company leased a mine from the Patton company, which contracted to purchase the entire output. The suit, which was

brought for \$11,150, alleged that the Patton company defaulted in payments. The Patton company claimed that the lessees used so much dynamite that a large percentage of slack was produced while the contract specified they should produce "the largest possible amount of lump."

KENTUCKY

Judge John Stewart, of Ashland, and Judge Harmon, of Pikeville, Ky., headed a delegation of coal-mine operators of the Big Sandy Valley district, which appeared June 16 before the State Tax Commission at Frankfort in an effort to obtain lower tax assessments on coal properties. They contended that in view of stagnant conditions in the coal markets and falling values, tax assessments are in many cases far beyond the physical value of coal properties. The Edgewater Coal Co., of Pike County, objected to an increase of \$140,000 on an assessment already at \$500,000, and the Big Sandy Coal Co., now assessed at \$1,000,000, got a raise of \$300,000.

MINNESOTA

Coal receipts by cars in St. Paul during April, just given out, show a loss as compared with April of 1923. Hard coal went from 172 to 117 and soft coal from 2,304 to 1,755.

Fuel oil burners for residential use have not proved a complete success in the Twin Cities. A number of concerns which started out to sell the devices have found that the business was not profitable, and have removed from expensive downtown showrooms to smaller ones located out from that district. Many of the smaller ones have quit completely. And the oil companies are losing interest in the fuel oil, and are getting away from it to the strictly commercial ends. Deliveries have been troublesome, access to the tanks uncertain, and many complaints encountered over deliveries. Indications are that the cost of delivering will be increased as a result of the experience of the last two winters.

NEW YORK

J. Fred Morlock has severed his connection with the Steamship Fuel Corporation, 33 Rector St., New York City.

The report of the Lehigh Valley Coal Co. for 1923, just made public, shows net income of \$5,237,083 after bond, interest and federal taxes, against an average net of \$3,651,935 for the five years to Dec. 31, 1923. This was equal

to \$4.32 a share on the 212,160 certificates of interest offered to stockholders of the Lehigh Valley Railroad Co., compared with \$3.01 a share for the five-year period. The company's deduction for bond interest did not include provision for any interest on \$15,000,000 of 5 per cent bonds for the reason that the issue was dated Feb. 1 of this year and did not enter into the financial structure of the company during 1923. Interest on this issue for the eleven months of the current year will be a charge against this year's income.

Ralph R. McKee, president of the McKee Coal Co., New Brighton, Staten Island, has been appointed a member of the Board of Education of New York City by Mayor Hylan. Mr. McKee is a graduate of Princeton University.

The Stokes Coal Co. intends to erect a new coal distributing plant on the block fronting the Harlem River between 141st and 142nd Streets, New York City.

OHIO

The offices of the Ohio Utilities Co. were removed July 1 to 150 East Broad Street, Columbus, according to an announcement by J. C. Martin, vice-president and general manager.

Gaylord No. 2 mine of the H. Walker Coal Mining Co., near Yorkville, resumed operations June 23 after a suspension of several months. The company is said to have obtained a contract for railroad fuel.

The sophomore miners of Case School of Applied Science, Cleveland, are taking their practice term in mine surveying at the Grant Coal Mine, Salineville, under the instruction of Anthony Jenkin, associate professor of mining engineering.

Based on sealed proposals received June 4 by the city Board of Purchase for approximately 700 tons of 2-in. screened Hocking Valley coal to be delivered in amounts specified by the chief of the Fire Department to the various engine houses of the city, the contract was awarded to the Lewis & Noon Coal Co., Columbus, on a bid of \$4.30 a ton.

Cincinnati wholesalers and operators in southeastern Kentucky are keeping a close eye on the deal by which the Louisville & Nashville hopes to gain complete control of the C. C. & O. Ry. Already large terminals are being placed at Whitesburg, Ky., and work is proceeding that will allow the Hazard people an outlet to the seaboard. With

this, they say, an entirely new era for southeastern Kentucky coals can be looked for.

The branch office of the Three States Coal Co. in the Frederick H. Schmid Building, in Cincinnati, will be closed as of July 1 and Frank Beazley, who has been in charge for nearly two years, will return to Bluefield, W. Va., the head office, where the business of the company will be transacted, according to advices that have been given to associates in the trade at the Queen City.

H. M. Harvey, president of the Harvey Coal Co., of Knoxville, has been in Cincinnati for several days past, called by reason of the hearing of the suit of his company for the return of its mining property in the Hazard district from Jewett, Bigelow & Brooks in the United States District Court at Covington, Ky. The mines were purchased on the ten-year payment plan and it is charged that the J. B. B. company defaulted on payments over a year ago.

PENNSYLVANIA

Fire, June 24, destroyed the tipples and equipment of the Yukon Coal Co., at Yukon, near Greensburg, Pa., entailing a loss of \$30,000. Rebuilding plans will be announced in about two weeks.

The Newborn mine, near Carrolltown, Cambria County, was put into operation last week after a lengthy shutdown. John Kelly, Carrolltown operator, is superintendent of the mine. Most of the miners are residents of Carrolltown and welcome the return to work.

State Mine Inspector C. H. Nesbitt has just completed his statistics on coal-mining operations for 1923 and turned them over to the printer for publication in pamphlet form. Coal production reached the record figure of 20,919,303 net tons, with a coke production of 4,689,641 tons, almost the entire coke tonnage—94.8 per cent—having been turned out by byproduct ovens.

The St. Clair Coal Co. is about to erect a new steel breaker adjacent to

its present breaker at St. Clair. The new plant will be equipped with three cone separators having a capacity to prepare about 1,400 tons of coal per day. The structure and equipment will be designed by H. M. Chance & Co., of Philadelphia, a license contract having been signed covering the use of the Chance sand flotation process at the plant.

E. S. Sheets, who a year ago purchased Ira Barron's coal interests south of Somerset, which includes a vein of cannel coal, has disposed of his holdings to the Superior Coal Co., formed by Attorney Ross E. Scott and James Davis, of Somerset. Mr. Davis is owner of an adjoining mine, and the entire acreage will be mined through the opening on the Davis property. The consideration was \$15,000. Mr. Sheets will move to Windber.

Workers taking matches, pipes or cigarettes to the mines of the Glen Alden Coal Co. at the Loomis colliery, Hanover Township, will be discharged, it was announced in the local press following the recent disaster at the colliery. This order at the Loomis, as well as other Glen Alden operations, is not a new one, company officials stated. It had been in effect long before the fatal explosion occurred several weeks ago.

Twenty-two candidates were successful in the nomination for first-grade mine foremen, 72 for second-grade certificates, 21 for first-grade assistant mine foremen and 41 for firebosses, according to an announcement by Mine Inspector Nicholas Evans, head of the board of examiners for the nine districts in the central Pennsylvania field. The examinations were conducted in Johnstown on May 27, 28 and 29. Additional examinations will be held at State College and in Pittsburgh on July 16, 17 and 18.

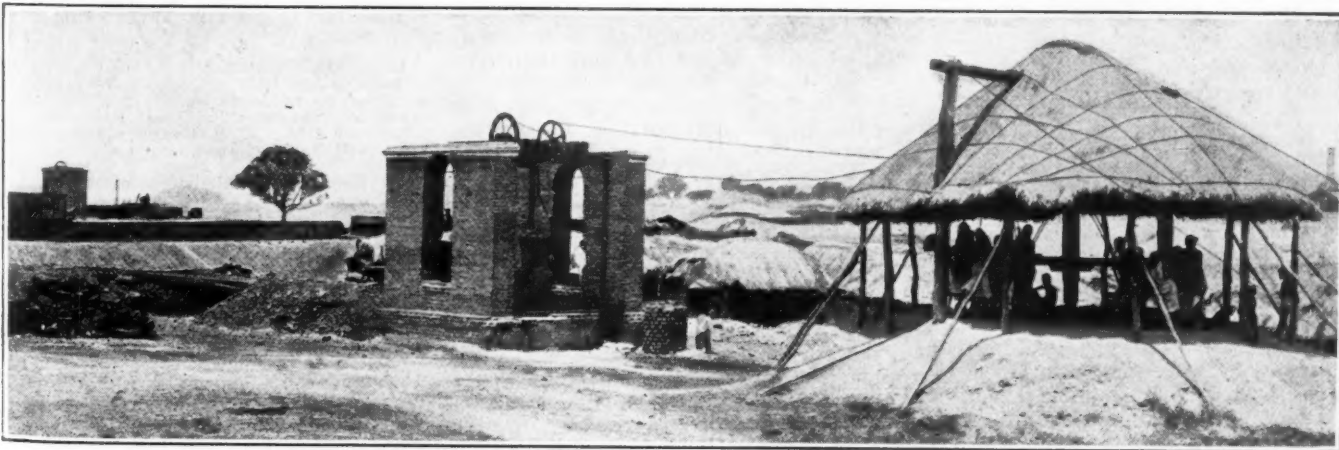
"When a Man's a Miner," a moving picture shown at the last meeting of the Pennsylvania Mining Institute held in Johnstown, showed conditions of a modern mine at Tiptonville, Ohio. A number of interesting scenes were shown, including a fall of roof which imprisoned miners for several days. "High and Low Voltage" was discussed

by Patrick Nairn, William Duncan and John Gelatly, of the Ohio Brass Co., of Pittsburgh. Papers on "Mine Cars" and "Mechanical Coal Loaders" were read by representatives of manufacturers. Talks on safety were given by Dean Holbrook and William Duncan, of State College. No more meetings will be held until Oct. 17.

The Bertha-Consumers Co., Pittsburgh, has issued \$2,000,000 first mortgage 7 per cent sinking-fund gold bonds dated June 1, 1924, and due June 1, 1934. The company has a capital of \$4,150,877 in 7 per cent cumulative preferred stock and \$4,908,458 in common stock and owns mineral rights underlying 4,443 acres of developed coal lands and leaseholds of additional mineral rights underlying 422 acres of developed coal lands in Allegheny and Washington counties, Pennsylvania, and Brooke, Monongalia, Marion and Kanawha counties, West Virginia. The total coal recoverable from these properties is estimated at 27,753,900 tons.

Of the 157 fatal accidents in the industries of the state in May, according to the Bureau of Workmen's Compensation of the Department of Labor and Industry, sixty-two occurred in the anthracite and bituminous mines. Forty-three fatalities occurred in the anthracite region and nineteen in the bituminous field. The largest number of mine fatalities in the anthracite district during May was recorded from Luzerne, which had eighteen deaths in the mines and only two in all other industries. In the bituminous counties Allegheny and Fayette led with four mine fatalities, each, Allegheny reporting eighteen other deaths due to industrial accidents and Fayette two deaths not attributed to the mining industry.

Two new all-steel towboats of modern design, built for coal and steel trade, will begin service in Pittsburgh waters during July. One is the steamer Donora of the American Steel & Wire Co., and the other is the steamer Sailor, of the Jones & Laughlin Steel Corporation. The Donora is being completed at the Howard Shipyards Co., Jeffersonville, Ind., on the Ohio River, and will be delivered early this month. The



Some Indian Mines Still Hoist Coal This Way

The photograph, from the Geological Survey of India, shows a winding gin near Charanpur, in the Raniganj coal field. Women in the merciful shade of the thatched roof, wind a 500-lb. load in a bucket up through the shaft. From the bucket it is usually loaded in a coal tub on a four-wheel truck and moved to a storage pile awaiting shipment.

Sailor is nearing completion in the yards of the Marietta Manufacturing Co., Point Pleasant, W. Va., also on the Ohio River. It is now almost ready for delivery. Both towboats contain the latest innovations in design and equipment for heavy duty in handling big tows of steel and coal on the Monongahela, Ohio and Mississippi rivers.

UTAH

The acquisition of one-half of the stock of the Denver & Rio Grande Western R.R. by the Missouri Pacific carries with it the transfer of one-half of the stock of the Utah Fuel Co. It is not expected, however, that this will involve any changes in the operation of the big coal company.

Coal production in Utah during May was 260,586 tons, compared with 311,955 tons for the same month last year.

WASHINGTON

Bunkering of steamships is increasing in Puget Sound. On June 14 the Danish steamship Transvaal and the Garland line steamer Carolinian, both cargoes with lumber for long voyages, coaled simultaneously at the Pacific Coast Coal Co.'s bunkers in Seattle—the only bunkers on the coast large enough to coal two such ships at once.

Hereafter the Indian Mine of the Pacific Coast Coal Co. will be known as the New Black Diamond, according to an announcement recently made by officials of the company. It is still in the development stage. The intention of the company, however, is to tap the famous McKay seam, which has been worked for many years at Black Diamond, a few miles further east, and preliminary surveys have indicated that this objective will be attained. The new mine is intended ultimately to supplant the Black Diamond mine, which is now the deepest coal mine on the American continent and nearing the end of profitable productivity. It is expected that New Black Diamond will be brought into full operation within the next few years. Several hundred thousand dollars is being spent by the Pacific Coast Coal Co. in developing the mine.

WASHINGTON, D. C.

Appropriations by Congress of \$1,900,468 will be available for the Bureau of Mines for the fiscal year beginning July 1. They include investigation of mine explosions, \$359,768; mine inspection, \$35,000; mine rescue and safety, \$262,300; purchase of mine rescue car, \$40,000; mineral fuel investigation, \$138,280; ore studies, \$128,360; oil and oil-shale investigations, \$500,000; administration of leasing law, \$91,360; mining experiment stations, \$200,000; Pittsburgh station, \$57,400; and maintenance of government fuel yards, the expenses to be paid out of the receipts. The Geological Survey is given \$1,706,482. These funds include topographic surveys, \$500,000; geologic surveys, \$333,722;

investigation of mineral resources of Alaska, \$75,000; examination and classification of lands, \$280,000. The General Land Office is given \$700,000 for surveying public lands, including inspection of mineral deposits and coal fields.

WEST VIRGINIA

A station is to be opened in Huntington on July 1 by the U. S. Bureau of Mines. W. H. Forbes will be in charge of the office, which will be located in the federal building. Mr. Forbes will direct the mine safety service work in southern West Virginia. "Although the bureau has had a mine safety car in the state doing mine safety work since 1910, it has just been decided to open engineer's headquarters here to keep in closer touch with mining men," declares Mr. Forbes. He stated that he would be glad to take care of requests from mining men for the examination of mines and report as to their condition. Huntington will be headquarters also for the mine car, which is equipped with all safety devices pertaining to mining.

The Hisylvania Coal Co., chartered under the laws of the State of Ohio, of which E. W. Blower of 8 East Broad Street, Columbus, Ohio, is secretary, has been authorized to transact business in West Virginia.

The following West Virginia coal concerns have increased their capital stock in the amounts given: Coe Pocahontas Coal Co., from \$200,000 to \$300,000; The Kalbaugh Coal Co., Inc., from \$25,000 to \$50,000; Buffalo Eagle Colliery Co., from \$500,000 to \$800,000; Glade Creek Coal & Lumber Co., from \$2,000,000 to \$2,150,000. The Fat Creek Coal Corporation has reduced its capital stock from \$100,000 to \$35,000; the Kanawha Valley Coal Co. has changed its capitalization of \$2,000,000 to 100,000 shares of common stock at \$10 and 10,000 shares of preferred stock at \$100,000.

The Pocahontas Fuel Co. has decided to close down the Itmann mines, in the Wyoming County field, for an indefinite period. This makes fourteen plants in the Winding Gulf district now in idleness because of lack of sufficient business to justify operation. Loading at other mines in the same district, however, is being increased and operators are inclined to believe that by mid-July it will be possible to operate plants on an average of from four to five days a week.

CANADA

The Dominion Coal Co. is opening a new mine, to be known as No. 1B, on the sea coast near the town of Dominion, N. S. The new shaft is equipped to produce coal for 100 years. A tunnel 10 ft. high has been cut in solid rock above the seam, and electric haulage locomotives will be used.

It is reported that the coal miners of Fernie, B. C., are considering a settlement of the strike now on through-

out District No. 18, United Mine Workers, which includes eastern British Columbia and the Province of Alberta, insofar as it affects the collieries of the Crow's Nest Pass Coal Co. The signing of a local agreement with the company was discussed at a special meeting and officials of the union have been called to the district to avert such action.

Coal production in British Columbia for the month of May totaled 114,752 tons. This compares with the average of 200,000 tons, showing the result of short working time. In the Crow's Nest Pass there is no output because of the strike. Although there is peace between the employers and employees in the Nicola-Princeton and Vancouver Island fields the demand is so weak that the collieries are unable to maintain operations at anything like capacity.

New Companies

The British Canadian Coal Co., Ltd., has been incorporated with a capitalization of \$500,000 and head office in Montreal by Harold Fisher, Livius P. Sherwood and Stanley M. Clark.

The Valentine Coal Co. has been incorporated with a capital stock of \$60,000 in Worland, Mo., by H. L. Rogers, A. A. Grimmel and others. Mr. Rogers is president of the company.

The Missouri-Oklahoma Fuel Co. has been incorporated in Muskogee, Okla., with a capital stock of \$700,000, by Wm. McKinnon, of Kanima, Okla.; E. D. Holley, Stigler, Okla., and others.

The Tennessee Coal Mining & Timber Co. has been incorporated in Chattanooga, Tenn., with a capital of \$500,000, and is reported to have purchased over 20,000 acres of coal and timber land near Coal-mont, Tenn.

The Oliver Fuel Co., a Philadelphia concern, has been chartered under the laws of the State of West Virginia, with a capital stock of \$50,000. Those principally interested in the company are J. A. Balenger, of Mullite, N. J.; C. P. Hagenlocher, F. D. Jones, W. Kaufman and William LaBelle, all of Philadelphia.

Industrial Notes

The Denver Rock Drill Manufacturing Co., of Denver, Colo., recently opened a Chicago branch office at 817-825 West Washington Blvd., with A. J. Philpott as manager.

Rome Wire Co. announces the opening of a sales office with a complete warehouse stock of its products at Ninth Street Terminal Warehouse, 1200 West Ninth Street, Cleveland, Ohio. C. R. Evans, district manager, will be in charge.

To better serve their customers in the Southwest, the Chicago Pneumatic Tool Co. has opened a branch office at 210 So. Jefferson Street, Dallas, Texas, with J. O. Bailey in charge, reporting to the New Orleans branch.

Herman Lemp, engineer in charge of the internal combustion engine engineering department of the General Electric Co., at Erie, has resigned his connection with that concern to join the Erie Steam Shovel Co. This follows an association with the General Electric Co. for 42 years.

The Nanticoke Valley Coal Co., of Wilkes-Barre, Pa., has just executed a license agreement with H. O. Staples for the use of the Chance sand flotation method at a washery to be located on the property of the Susquehanna Collieries Co. near Nanticoke, Pa., at what is known as the Nanticoke No. 7 bank. The plant will be equipped with a 15-ft. cone separator.

Traffic News

South Dakota Would Retain Low Rates on Lignite

The Board of Railroad Commissioners of South Dakota has made a strong plea to the Interstate Commerce Commission in the interest of the continuance of lower rates on lignite than that charged for high-grade bituminous coal. If proposed increases are allowed to go into effect, the use of South Dakota lignite will be restricted to the localities immediately surrounding the mines, it is asserted. The board contends that it is of great economic importance to the Northwest to make use of this low-grade fuel. It is stated that the present lignite rates yield a reasonable revenue and that lignite is entitled to a classification different and lower than coal.

To Hold Hearing on Proposal to Advance Rates in Ohio

The Coal, Coke and Iron Ore Committee, Central Freight Association Territory, will hold a hearing in Room 606, Chamber of Commerce Building, Pittsburgh, Pa., Thursday, July 17, 1924, at 10 a.m., daylight saving time, on a proposal to increase the rate on bituminous coal, carloads, from mines on the Baltimore & Ohio, New York Central (Ohio Central Lines), Pennsylvania and Wheeling & Lake Erie roads, in the Shawnee, Hocking and Crooksville (Ohio) districts, to local stations on the Baltimore & Ohio R.R., Lexington, Ohio, to Fredericktown, Ohio, inclusive. The advance proposed, from \$1.39 per net ton to \$1.51 per net ton, is to restore these rates to the Mansfield (Ohio) basis, which was the basis in effect prior to Aug. 15, 1919, and which basis or higher is now in effect from other Ohio districts, including short-haul rates.

Delivery of Pennsylvania's New Cars to Begin Soon

Delivery on the 12,000 freight cars ordered soon after the first of the year by the Pennsylvania R.R. will start this month. The Pennsylvania is preparing to accept between 125 and 150 cars a week during the first few weeks of delivery, with a gradual increase in the number until practically all of the cars will be on line for the movement of the autumn traffic.

Mistrial in Demurrage Suit

Trial of the test case of the Smokeless Fuel Co. against the Chesapeake & Ohio Ry. to establish a basis for deciding the old war-time demurrage suits, in which practically all coal agencies at Norfolk port are endeavoring to collect approximately \$250,000 from the railway for alleged overcharge for demurrage, was halted in Newport News last week when it was found that a member of the jury was an employee of the railroad. A mistrial was ordered after the case had proceeded for three days, and it has been set for retrial in July.

Virginian Moves Big Coal Train

The Virginian Ry. on June 9 hauled out of Princeton, bound for Roanoke, a 10,200-ton coal train, using a 700 U. S. Mallet type engine, which is said to be a record with this type of engine. The train consisted of 65 120-ton coal cars. In May, 1921, the Virginian operated a demonstration train out of Princeton consisting of 100 loaded 120-ton cars, but the train was drawn by the big 800 type engine.

Obituary

Edgar M. Reynolds, vice-president and comptroller of the Lehigh Coal & Navigation Co., of which he had been an officer for more than 20 years, died at his home in Germantown, Philadelphia, June 16, after an illness of four weeks. He was born in Newark, N. J., in 1861, and had 19 years' experience in the railroad field before joining the L. C. & N. At the time of his death he also was an officer and director of several companies affiliated with the L. C. & N.

Trade Literature

Webster from the Air. Warren, Webster & Co., Camden, N. J. Pp. 30; 6x9 in.; illustrated. Contains aerial photographs of cities where the Webster steam-heating system has been installed.

The Century Wood Preserving Co., Pittsburgh, Pa., has issued a four-page folder describing the advantages, effectiveness, construction, capacity and reliability of the Shipley Treating Unit for timber preservation.

Wire Rope. Macwhyte Co., Kenosha, Wis. Pp. 80, 5½ x 7½ in.; illustrated. Describes uses and kinds of wire rope and fittings, being designed to answer all questions pertaining to wire rope in as few words as possible.

Tempo Shower Washing Equipment for Mine, Mill and Factory. James H. Channon Mfg. Co., 223 West Erie St., Chicago, Ill. This 6-page folder describes and illustrates showers, wash-sink faucet and water tempering system.

High and Dry. James H. Channon Mfg. Co., 223 West Erie St., Chicago, Ill. Pp. 17; 6x9 in.; illustrated. Describes the Union sanitary clothes hanger suspended by chain and pulley from the top of the room, with a basket arranged to hang above the clothes for lunch and valuables. Price list is appended.

Storage Battery Locomotives. Mancha Storage Battery Locomotive Co., St. Louis, Mo. Pp. 10; 9x10½ in.; illustrated. Among the locomotives described is the Little Tramper which will run onto a small mine cage and go to any level like a mine car.

Coming Meetings

World Power Conference, Wembley, London, England, June 30-July 12. O. C. Merrill, Federal Power Commission, Washington, D. C.

First International Management Congress, Prague, Czechoslovakia, July 21-24.

Rocky Mountain Coal Mining Institute. Summer meeting, Aug. 7-9, Rock Springs, Wyo. Secretary, Benedict Shubart, 521 Boston Bldg., Denver, Colo.

New York State Coal Merchants Association, Inc., 14th annual convention, Sept. 4-6, Stamford-in-the-Catskills, N. Y.; headquarters Churchill Hall. Executive secretary, G. W. F. Woodside, Arkay Building, Albany, N. Y.

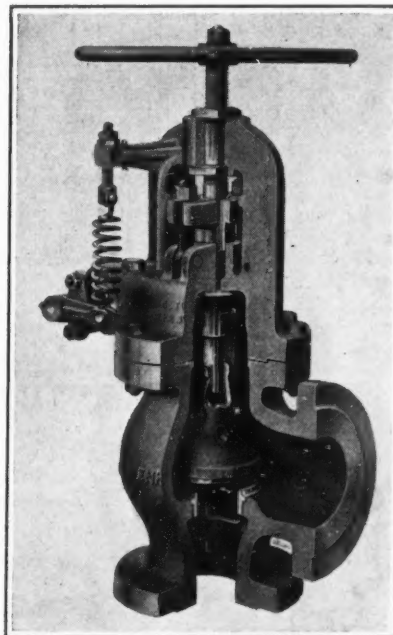
New Equipment

New Non-Return Valve

The Lunkenheimer Co., of Cincinnati, Ohio, has recently placed on the market the safety non-return valve, intended to be placed on the outlets or nozzles of steam boilers, shown in the accompanying illustration. This device is intended to supplant the ordinary check valve often used on boilers to prevent a flow of steam from the header, or from another boiler back into a unit not in use. As may be seen from the illustration, which shows a section through the device, it consists of what practically amounts to a globe valve with a spring-counterbalanced disk. As may be noted, the spring as well as its adjusting mechanism is external to the valve proper.

The stem of this valve is not connected to the disk, but the disk slides upon it when the stem is raised. Counterbalancing the disk by means of the external spring obviates all chattering of the valve against its seat. When the boiler upon which one of these valves is installed generates sufficient steam pressure to lift the disk from its seat, it is automatically cut into the line. However, should a tube burst or a header in the boiler be ruptured, causing a backflow of steam from the header to the boiler, the valve immediately closes and prevents steam from other boilers reaching the one which is injured.

This valve forms a highly effective safety device in case a boiler is being cleaned. Even if the stem is raised through accident or otherwise, the valve closes the instant pressure from



Half Section of Valve

The counterbalanced seat slides on the valve stem. The valve may be closed by operation of the handwheel but it can be opened only by pressure from below the disk.

the outside is applied and will not permit a back flow of steam into the boiler being cleaned or inspected. In the past, many distressing accidents have resulted from such causes as have just been outlined.

Gyrating Coal Shaker

Those familiar with present practice followed in anthracite preparation well know the great overall length of shaking screens. Such shakers occupy much space in the expensive structure of the breaker in which they are employed. Could this length be materially decreased it would result in economies out of direct proportion to the actual decrease in overall dimensions.

In order to accomplish this result H. W. Falker, of Ashland, Pa., has developed what has been named the Master screen shown in Fig. 1. This is a development of, or an improvement on the Economy gyrating screen developed by Mr. Falker some years ago. In the original screen the eccentrics driving the screen decks revolved in opposite directions affording elliptical paths of different amplitude to each point on a screen deck, as may be seen in Fig. 2. In order to obviate this difficulty and the unequal wear of the screen which it entailed, in the new device the eccentrics revolve in the same direction. This gives every point on the screen a circular motion equal in diameter to twice the throw of the eccentrics.

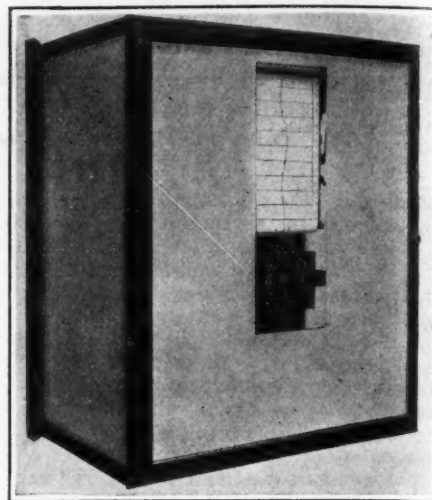
Advantages claimed for this machine include the following: All portions of the screen plate are used to maximum advantage and there is small tendency for the holes to wear elliptical. As all points on this screen describe circular

instead of rectangular paths as in the case with the ordinary screen, the effectiveness of the two should be to each other as the circumference of a circle is to its diameter, or as $\pi : 1$. Thus the same screening effect should be secured with less than one third the screen area. The floor space occupied by a screen of this kind as compared to that necessary for the ordinary shaker will be even less proportionately, as no long eccentric rods are necessary.

Totalizing Polyphase Wattmeter

A recent General Electric Co. development is a totalizing recording wattmeter. This instrument is direct acting and operates on the induction principle. The moving element consists of a shaft approximately 36 in. in length on which are mounted four metallic disks. Grouped around these disks are split-phase torque producing elements, sixteen in number, thus making it possible to totalize any number of polyphase circuits from two to eight. A strip chart, 6 in. in width, is employed, and the record is made by a siphon type pen connected to the moving element through a simple link. The high torque of this instrument makes it available for operating remote indicators.

A complete line of remote indicators for use in conjunction with these instruments is now available. These indicators are of various styles and sizes but are all operated by Selsyn motors, actuated by a Selsyn transmitter geared to the shaft of the wattmeter instrument. This Selsyn system consists of a transmitter and



Wattmeter for Totalizing Power

This instrument is composed of many metering elements so connected that it is possible to totalize the consumption of power in from two to eight polyphase circuits.

motor so connected electrically that rotation of the transmitter causes a similar rotation of the motor. Manually operated transmitters and indicators are supplied as well as combinations of both manual and automatic indicators.

Steel Transmission Pole

The Truscon Steel Co., of Youngstown, Ohio, has recently placed on the market the new steel transmission pole shown in the accompanying illustration. Poles of this kind may be manufactured in all sizes up to 50 ft. in length. One salient feature of this new steel pole is its simplicity of construction, being pressed from 5 in. to 12 in. steel channels or I-beams. The design is such that no special equipment is needed by the lineman for ascending or descending, thus eliminating all necessity for climbing spurs or steel steps.

This pole is adaptable not only to transmission and distribution lines, but to telephone, trolley and street lighting systems. It is made by pressing a portion of the web of a channel or I-beam out to a predetermined angle and then riveting this section to another of a second channel or I-beam. Before this pole was placed on the market in quantity, it was subjected to practical tests under varying conditions for a period of two years. It is claimed by the manufacturer that when this pole is anchored in concrete and painted once every five years, it will last indefinitely. It is also maintained that because of the ease of its manufacture, it will ordinarily cost about the same as a wood pole. In some sections of the country its cost may be less.



Fig. 1—Side and End Views of Gyrating Screen

Two vertical eccentric shafts revolve in the same direction, thus imparting a rotary motion to the screen decks. A screen with any even number of decks may be balanced so that vibration is neutralized.

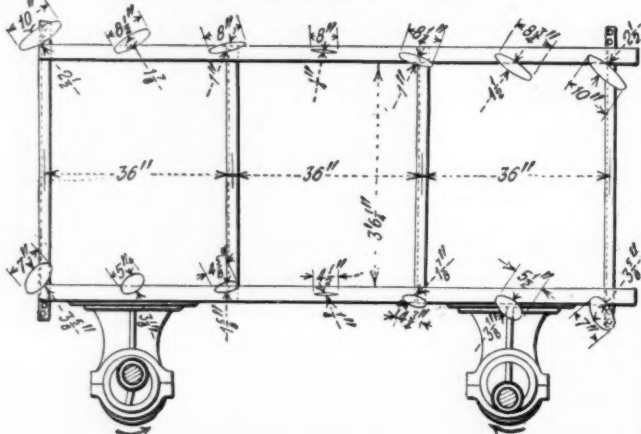
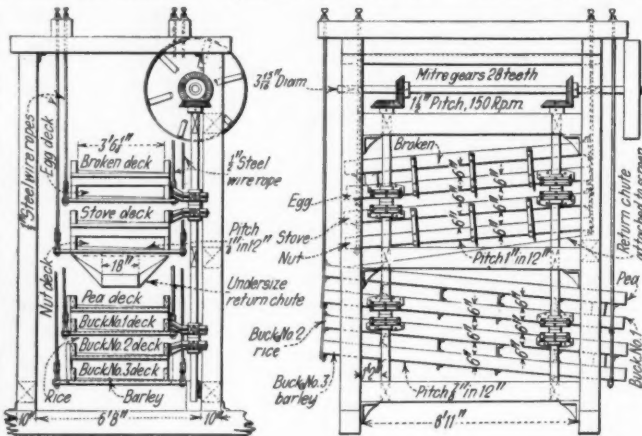


Fig. 2—Unequal Travel Imparted by Opposite Eccentrics

Revolving the two vertical shafts in opposite directions impart an unequal travel to all parts of the screen, each point upon it moving in a more or less elongated ellipse. This results in unequal wear of the screen plate.